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TO CALLERS AND TELEPHONERS

Until further notice our office hours are: Mondays to Fridays, 9.30 a.m. till 5.30 p.m.
The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Chambers of Commerce and Nationalisation

A VIEW that is widespread in industry was put into words by Mr. J. S. Dodd in his Presidential Address to the annual meeting of the Association of British Chambers of Commerce in London last week. He formally called on the Government to halt the extension of its policy of nationalisation until conditions were nearer normal and until measures already on the Parliamentary stocks had proved or disproved their value. Mr. Dodd also dealt with the unfortunate effects of lack of cohesion in Government utterances. Employers realised the need for collaboration with the Government to secure maximum production, but he suggested that Ministers should take steps to see that neither they, their colleagues, nor their supporters indulged in the policy so apparent recently of criticising those who conducted the affairs of industry, and alternate between abuse, cajolery, threats, and imprecations. Talk of this kind reduced the confidence of employees in their employers, and in such an atmosphere no man could make a useful contribution. Mr. Dodd's speech underlined the point frequently made in these columns, that the greatest need at the present time in the furtherance of industrial efficiency, is the promotion of confidence among industrialists and the removal of so many uncertainties which are inherent in the present Government policy.

Mr. Oliver R. H. Bury

The death of Mr. Oliver Bury on March 21, at the age of 84, came soon after his retirement from the board of the London & North Eastern Railway Company, with which system he had very long associations. Mr. Bury, whose great uncle was Edward Bury, first Locomotive Superintendent of the Great Northern Railway, and Senior Partner of Bury, Curtis & Kennedy, locomotive builders, of Liverpool, who built more than 100 locomotives for the London & Birmingham Railway and also a considerable number for the Great Northern, ceased to be a director of the L.N.E.R. last November, after having sat on that board since its formation in 1923. Before then he had been for 10 years a director of the Great Northern Railway Company, of which he served as General Manager from 1902 to 1912. Mr. Bury's early training was in the engineering and locomotive departments of the London & South Western Railway. He was appointed Chief Engineer of the Great Western of Brazil Railway in his early thirties, and after a successful career in Argentina he left the General Managership of the Buenos Ayres & Rosario Railway in 1902, when he was still only 40, to return to England and become General Manager of the Great Northern Railway Company. He joined the board of the G.N.R. when he was 50. His wide experience in the administration of railways made Mr. Bury's counsel particularly valuable, and while a director of the London & North Eastern Railway Company he acted as chairman of some of the principal committees of the board. Mr. Bury's former directorates covered a wide range of interests, including at one time the Chairmanship of the San Paulo (Brazilian) Railway, the Leopoldina Railway Co. Ltd., the London Electric Supply Corporation Limited, and the Peruvian Corporation.

Indian Railways and the War

In a recent issue, our contemporary *Capital* gave a number of interesting facts regarding Indian railways during the war. The following comparisons were first tabulated:—

	1938-39	1944-45
No. of passengers carried each month	45 millions	80 millions
Mileage travelled by them each month	1,525 millions	3,000 millions
Average passenger train loads in coaches	8 to 10	13
No. of special military trains a month	29	920
Mileage run by these trains each month	8,000	1,000,000
Freight tonnage carried each month	10 millions	11½ millions
Mileage this freight was hauled each month	1,850 millions	2,500 millions

Passenger train loads increased by 32 per cent. and goods train loads by 8½ per cent. One railway recorded an average of 95.4 wagon-miles per wagon day on its metre-gauge section in a recent month. The average load of broad-gauge wagons increased from 52 to 74 per cent. of maximum capacity, a very high figure. A Railway Priority Organisation was introduced in April, 1942 (a) to ensure the rapid movement, in order of their importance, of commodities essential to the war effort and civil needs; (b) to eliminate wasteful move-

ment; and (c) to co-ordinate rail and other forms of transport. A large volume of traffic was diverted from the railways to coastal steamers and country craft, and also to road transport. Some railways initiated their own road transport services to prevent bottlenecks in military traffic.

Machine Tool Advisory Council

In a report presented to the Director-General of Machine Tools, the Machine Tool Trades Association advocated a means of permanent consultation between the industry and the Government to carry on the intimate and fruitful bond between the two parties which grew up under the stress of war. Addressing the association at a luncheon on April 9, Mr. John Wilmot, Minister of Supply, announced that this proposal had been realised by the establishment of a Machine Tool Advisory Council, charged with the duty of advising on measures necessary to promote and maintain an adequate and healthy British machine tool industry. The council is under the Chairmanship of Mr. S. F. Steward, until recently Director-General of Machine Tools, and its composition is given in our Personal pages this week. Congratulating the Machine Tool Trades Association on the constructive and far-sighted recommendations of its report, Mr. Wilmot referred to the creation of a special machine tool department within the new Engineering Industries Division of the Ministry of Supply, which will meet the suggestion made in the report for a single Government department to keep contact with the industry.

The "Golden Arrow" Runs Again

It was not only a restored, but a modernised "Golden Arrow" Pullman car express that made a demonstration run between London and Dover on April 13, as reported elsewhere, preparatory to resuming public service last Monday. For the first time the train was hauled by a "Merchant Navy" class Pacific, making its war-delayed *début* on one of the duties in mind when these engines were designed. Inside the train, a public address system in all cars is a new feature, and the refreshment services of the Pullman Car Company are now reinforced by a Trianon cocktail bar car. The Southern Railway steamship, ss. *Canterbury*, which provides the Dover-Calais link in the "Golden Arrow" service, has been re-decorated after a noteworthy wartime career, and now sports a new mast from the top of which a rotating radar aerial transmits to the bridge a plan view of all objects within a 30-mile radius of the ship. Fog will no longer be able to impede the speedy passages implied by the pre-war slogan, "Dover and you're over." On its present schedules the "Golden Arrow" gives an 8½-hr. journey to Paris, and a 9-hr. journey returning. We have no doubt that the arrangements made for the comfort of visitors last Saturday were a foretaste of the service that will be offered to travellers on the regular journeys.

Contacts Between Permanent Way and Signalling

An admirable paper by Mr. F. H. D. Page, Signal & Telegraph Engineer of the Great Western Railway, introduced a spirited discussion at a joint meeting of the Permanent Way Institution and the Institution of Signal Engineers on April 10. The subject was some of the problems which concern both the permanent way and signal departments of the main-line railways, and, basing his remarks on standard G.W.R. practice, Mr. Page emphasised that developments in design and practice during recent years, in both permanent way and signalling, had given rise to a number of new problems which had proved difficult of solution. The signal engineer has very little to say in the design of permanent way fittings, and has to accept developments and modifications as accomplished facts. Mr. Page felt that some, at least, of the problems which arise might have been simplified had the signal engineer been consulted in advance. We hope to publish an abstract of this paper in a subsequent issue.

Does France Need a Motor Highway System?

From time to time in France, as elsewhere, voices are heard urging the construction of a network of *Auto-routes*, in imitation of the German *Autobahnen*, or the motor highways seen in some other parts of the world. In its section devoted

to problems of the future, our new contemporary *La Vie des Transports* has been setting out the arguments for and against the plan in a well-balanced and impartial way. The conclusion drawn is that, when everything is fairly taken into consideration, there is no justification for regarding such a costly undertaking as necessary in France. It is doubtful whether either the industrial or agricultural life of the country would benefit appreciably, or that the general interests of France could be advanced by it. That country already possesses a fairly good transport system in various forms. The construction of a general system of motor highways does not appear to be warranted in present circumstances.

British Railway Investments in Chile

The amount of British capital interested in the development of the Republic of Chile, although substantial in relation to the area and population, has never been so large as in Argentina or Brazil. The figures published annually by *The South American Journal* show that in 1945 the total British investment in Chile was £49,518,496, and interest on this sum amounted to no more than £734,278, or 1.4 per cent. As much as £11,977,844 was unremunerated. In this instance the capital invested in railways comes off little worse than that in Government bonds, so far as interest is concerned, which is unusual in the South American Republics. At the end of 1945 there was £24,967,303 of British money in Chilean Government bonds, and this received £284,923, or 1.1 per cent. in interest. In the case of the railways, the amount invested was £16,485,158, and the interest receivable was £177,488, or 1 per cent., but although the national debt held by British investors was all remunerated, in the case of the British interests in railway securities there was £9,615,344 which received no payment of interest. In industrial enterprises in Chile there was some improvement during 1945, for of the £8,066,035 invested, interest of £271,867, or 3.3 per cent., was received, and the amount of unremunerated capital was £2,362,500. The rate of interest on these securities showed an improvement on the 2.7 per cent. returned for 1944, when the value of securities which received no return was £2,812,500.

Losses in the Netherlands Signal Department

Those engaged in signalling in this country will learn with regret that the war has taken a heavy toll among their colleagues in the Signal Department of the Netherlands Railways, including the chief of the department, Mr. H. J. Van Aalderen. The extension of automatic signalling on the Dutch lines owed much to his efforts. It appears that in August, 1944, Mr. Van Aalderen was called to a consultation with the German military railway representative at the railway head offices and has not been seen since. It is known, however, that he was sent with his eldest son to a camp in Germany. One of his principal assistants, Mr. W. L. Baron Van Heemstra, is known to have been murdered. Mr. F. Van der Veen, a Divisional Signal Officer, has also disappeared, having been sent away in winter in an open truck with many others, including the prominent railway civil engineer, Mr. W. Simon Thomas. Many cases occurred of persons being killed while endeavouring to save signal equipment from unexploded bombs. Mr. De Vos, the former Chief Signal Engineer, and especially well known in England, is unharmed.

120-ft. Turntables

The scale of much modern American motive power causes operating problems of a kind completely unknown in earlier years. One of these is the turning of the largest locomotives. Even the 100-ft. turntable is no longer adequate on railways which use articulated steam locomotives. The British Garratt type of articulated locomotive, though lengthened by the fact that its boiler is mounted between the two chassis, instead of above them in the more liberal loading gauge conditions in the United States, carries its supplies of coal and water on its own main frames; it can therefore be operated in either direction without turning, like a tank locomotive. The American articulated locomotive, however, requires a separate tender for its supplies and so must run chimney first; also the consumption of these mammoths is on a scale that makes necessary 14-wheel and even 16-wheel tenders to provide adequate coal and water space. Engine and tender are thus extended to

such a degree that the latest Union Pacific 4-8-8-4 locomotives of the "Big Boy" type, with their 14-wheel tenders, have a total wheelbase of 117 ft. 7 in., and require 120-ft. turntables at both ends of their run. Other railways have resorted to unusual expedients to keep their engine wheelbases within 100-ft. turntable limits, such as the exceptional overhang at the rear end of the 14-wheel tenders of the latest New York Central 4-8-4 "Niagara" class.

Showing the Gradient in the Box

In returning a verdict of accidental death on the victims of the accident on the L.N.E.R. at Ferryhill, Co. Durham, on January 4, the jury expressed the opinion that there should be a diagram in every signal box showing the gradients in the block sections on each side. The signalman concerned had imagined that there was a rising gradient on the approach to his box from the direction in which the first of two trains came, whereas in fact the reverse was the case, and the mistake affected the action he took. Undoubtedly the neighbouring gradients can be of considerable importance in influencing a signalman's actions in emergency. Many signal-box diagrams do give this information, but others do not. Practice as regards the form and details of these diagrams varied considerably between the pre-grouping lines. Some supplemented their diagrams by mechanical and—when required—electrical locking tables, while others provided little or no information of the kind. Our preference is for giving as much detail as possible, as it is helpful at times to a relief man.

Steam Locomotive Ratings

Mr. A. J. Totten, writing in our American contemporary, the *Railway Age*, enumerates the many variables which make it impossible to determine the horsepower of a steam locomotive like that of an electric or diesel-electric locomotive, and discusses the preparation of speed-tractive effort curves from which can be calculated, with reasonable accuracy, the performance of any given steam locomotive in handling trains over a particular gradient or line profile. In 1938 the American Railway Engineers' Association had drawn up a normal rating basis taking into account the weight on the coupled wheels and the relation between such weight and the total engine weight for different types of locomotives. Mr. Totten gives specimen calculations under the A.R.E.A. method and adds, as a check, the horsepowers calculated by the so-called "boiler method" and by the "grate method"; he takes the maximum figure obtained by these three methods and establishes his speed-tractive force curve, having tabulated the normal cylinder horsepower and piston speeds for various running speeds. He then brings in the well-known Davis formula for the calculation of locomotive and tender resistance at the running speeds already tabulated, and, next, having set down the corresponding drawbar pulls, he obtains the drawbar horsepower. Finally, he considers a specimen passenger train, having a given number of coaches, axles, etc., with a known maximum speed, and, again using the Davis formula, and allowing for possible air conditioning, he succeeds in analysing the data applicable to the particular train so that the resistance of coaches, engine, and tender are all separated at the various speeds, and the unit resistance in pounds per ton is revealed.

Pennsylvania Duplex Locomotive Test Results

The extensive tests carried out at the Altoona locomotive testing plant, on the new Pennsylvania 4-4-4-4 duplex four-cylinder locomotive, and recently published by Mr. Ralph P. Johnson, Chief Engineer of the Baldwin Locomotive Works (by which firm the design was originally proposed) show the new type to be one of the most outstanding designs of the present day. We give an abridged account of the valuable information made public by Mr. Johnson, in an article on p. 431. The performances of a formidable rival, a 5,400-h.p. diesel locomotive, are eclipsed at all but very low speeds, and several record-breaking figures were obtained on the test plant, especially in the boiler evaporation, the low water rate, and the maximum horsepower developed. Here, then, is a machine which will haul sixteen 80-ton passenger vehicles

on level track at speeds of over 100 m.p.h. Whether such performance ever will be demanded of British locomotives is not easy to say, but the trend is always in that direction; and if pre-war high speeds are to be permitted on British railways, at any rate with anything other than very light stock, our engineers may well consider the possibilities of the duplex type. Great credit is due to the Baldwin engineers for the painstaking persistence with which they overcame all the obstacles in the development of this remarkable design, amongst which the chief difficulty was probably the prejudice against the comparatively long wheelbase involved—a feature which had caused three other American railways to reject the proposal when it was put to them during 1932-36. The Pennsylvania administration also deserves high praise for the courage to put the idea to the test—with results which have vindicated so triumphantly the soundness of the design.

Railway Statistical Returns

DURING the war considerations of national security precluded the publication of much statistical information relating to the operation of the British railways, and from time to time in these columns the desirability of publishing more comprehensive data relating to the railways has been stressed. The last annual statistical returns, which related to the year ended December 31, 1938, were included in the report of the Ministry of Transport dated July 28, 1939. The annual reports of the railway undertakings since the outbreak of war have omitted the statistical returns which were a feature of them in peacetime years. As a result of this statistical blackout, the student of railway affairs in this country has been placed at a disadvantage in comparison with his counterpart in such countries as the United States where, throughout the war, full railway statistics have been published.

The Ministry of Transport has now published a summary table* of statistical returns for the years 1938-1944. Shortage of staff made it necessary for the railways to suspend the collection of some of the information kept in normal times, and to make changes in the basis of other particulars. As a result, it is not possible to provide a continuing record covering the war years of the particulars previously published. The present table has been compiled by the railway companies and the London Passenger Transport Board on the basis, in certain cases, of estimated figures designed to provide some important statistical information relating to railway operations during the war years, and to reflect the changes in the kind and extent of the activities of the railways throughout the greater part of the war.

One drawback to the present compilation is the fact that the figures relate to the control of railway undertakings as a group, and not to the individual companies. Separate tables have been prepared in respect of the London Passenger Transport Board covering the working of the Board's railways and road vehicle passenger traffic. The Board's electrical train working has been amalgamated with that of the railways of Great Britain.

It is impossible to comment adequately on the figures with the limited space at our disposal, but some of the salient features are dealt with below. The stock of steam locomotives at the end of 1944 was 20,076, an increase of 430 compared with 1938, despite the number lost overseas and destroyed by air raids. This increase was due to the retention in service of many engines which had exceeded their normal economic life, and this was only made possible by carrying out abnormally heavy repairs. Comparatively little variation occurred during the war years, however, in the number under and awaiting repair as compared with 1938. On the other hand, the stock of passenger carrying vehicles at the end of 1944 (41,212) was 2,280 less than in 1938, this representing a loss of some 96,980 seats, a serious matter when passenger traffic reached such abnormally high proportions. The stock of railway-owned merchandise and mineral wagons increased during the six years by 23,158 vehicles to a total of 686,747, due to condemnations being deferred, and the stock of requisitioned private-owners' wagons rose between 1939 and 1944 by about 1,500 to 585,291. The shortage of labour and materials, which

* "Summary Table of Statistical Returns of Railways of Great Britain, 1938 to 1944." H.M. Stationery Office. Price 4d.

gradually became more stringent during the war years, is reflected in the fact that the number of railway wagons under and awaiting repair rose from 18,800 in 1938 to 49,501 in 1944, while the number of requisitioned privately-owned wagons under and awaiting repair rose from 22,115 in 1940 to 39,462 in 1944.

Certain statistics are made available for the first time. Thus requisitioned private owners' wagons are shown in some detail. No comparison is possible with the peacetime year 1938, when the wagons were in individual hands, but from 1939-1944 the figure for both requisitioned wagons and also non-requisitioned private owners' wagons are as follow:—

REQUISITIONED PRIVATE OWNERS' WAGONS							
Particulars	1938	1939	1940	1941	1942	1943	1944
8 tons ...	—	28,114	27,048	25,775	24,312	23,190	22,505
10 " ...	—	272,901	269,293	268,029	266,938	266,205	265,395
12 and 13 tons ...	—	269,782	268,992	269,245	270,334	272,523	273,443
14 and 16 " ...	—	—	—	—	—	2,125	4,501
15 tons ...	—	3,899	3,886	3,691	3,758	3,797	3,776
20 tons and over ...	—	9,093	9,671	9,629	9,712	14,226	15,671
Total ...	—	583,789	578,890	576,369	575,054	582,066	585,291
Under or awaiting repair ...	—	—	22,115	27,438	25,698	28,176	39,462
Available ...	—	—	556,775	548,931	549,356	553,890	545,829

TONNAGE CAPACITY OF REQUISITIONED WAGONS (APPROX.)

Particulars	1938	1939	1940	1941	1942	1943	1944
Total ...	6,566,542	6,523,424	6,499,998	6,493,661	6,627,458	6,689,603	6,689,603
Average per wagon	11.25	11.27	11.28	11.29	11.39	11.43	11.43

NON-REQUISITIONED PRIVATE OWNERS' WAGONS

No.	1938	1939	1940	1941	1942	1943	1944
...	21,310	27,549	28,034	27,589	26,905	26,381	26,381

Of the merchandise and mineral vehicles owned by the railways, as from 1939 large numbers of 12-ton wagons were uprated to 13 tons, and a new heading relating to the changed capacity is now given separately for each of the years 1939-1944. Information is also incorporated in respect of wagons on loan to the War Department for the years 1940-1944, and statistics of the number of wagons under or awaiting repair are also shown. One of the most interesting features in the tables relating to rolling stock is the repair position, which in summary is shown below:—

Particulars	1938	1942	1943	1944
Locomotives:				
Total owned ...	19,702	19,935	19,995	20,137
Operating stock ...	19,659	19,677	20,593	20,172
Loans ...	—43	—258	+598	—35
Awaiting repair ...	1,190	1,350	1,290	1,257
Available ...	18,469	18,327	19,303	18,915
Passenger carriages:				
Total owned ...	43,492	42,133	41,731	41,212
Loans ...	—	—449	—617	—658
Operating stock ...	43,492	41,684	41,114	40,554
Awaiting repair ...	2,699	2,450	2,710	3,249
Available ...	40,793	39,234	38,404	37,305
Merchandise and mineral vehicles:				
Total owned ...	663,589	677,710	683,561	686,747
Loans ...	—	—155	—145	—131
Operating stock ...	663,589	677,555	683,416	686,616
Awaiting repair ...	18,800	27,233	29,114	49,501
Available ...	644,789	650,322	654,302	637,115

It is of considerable interest that the average tonnage capacity of railway-owned wagons increased slightly every year during the war; the figure for 1944 was 12.63 tons, as compared with 12.01 tons in 1938. Similarly, the average capacity of requisitioned privately-owned wagons rose from 11.25 tons in 1939 to 11.43 tons in 1944.

Engine mileage, which in 1938 totalled 420,942,000, was 359,122,000 in 1942, 360,284,000 in 1943, and 357,093,000 in 1944. Coaching train miles, 287,371,000 in 1938, were at their wartime lowest in 1940, when they were 201,267,000; from 203,216,000 in 1942 they rose to 204,198,000 in 1943, but in 1944 were back to 202,052,000. Between April and October, 1944, passenger services were curtailed drastically to free locomotives and train crews for military movements in connection with the invasion of North-West Europe. Freight train miles, on the other hand, have been consistently higher than in 1938 throughout the war years. They were 155,906,000 in 1942, and rose to 156,086,000 the next year. For 1944 they were 155,041,000.

The number of passengers originating in 1938 was 1,237,242,000 which, after falling to 966,611,000 in 1940, rose steadily until by 1944 it was 1,345,339,000. The average receipts per passenger journey have shown a considerable increase, indicating longer journeys. This has applied to all classes of ticket, and the total, which was 11.38d. in 1938, by 1944 had risen to 2s. 1.83d., and per train mile the 1938

figure of 5s. 2d. had become no less than 15s. 10d. The receipts are to some extent affected by the increase in fares and charges for 1939-1940, but these in total do not represent an advance of more than 16½ per cent. The heavy increase in journeys under the heading of "other descriptions" of passenger travel which rose from 244,252,000 in 1938 to 340,134,000 in 1942 and was still 307,430,000 in 1944, reflects growth in travel by the Forces at reduced rates.

Estimated passenger miles are given for only two wartime years and the comparison is with the year from September, 1938, to August, 1939, inclusive, but these figures together with those for the average distances per journey clearly indicate the change which occurred. They are as follow:—

Estimated passenger miles (Main-line companies):			
	1938	1943	1944
Ordinary ...	12,550	25,613	25,531
Workmen ...	1,737	3,015	2,791
Season tickets ...	4,706	3,645	3,730
Total ...	18,993	32,273	32,052
Average distance per journey (Main-line companies):			
Ordinary ...	21.92	38.89	37.42
Workmen ...	7.21	9.46	9.50
Season tickets ...	12.45	12.37	12.37
Total ...	15.94	25.40	25.12

Total freight train tonnage which in 1938 was 265,748,000 rose to 295,083,000 in 1942 and after touching 300,858,000 for next year was slightly lower at 292,563,000 for 1944. The average receipt per ton rose from 6s. 7d. in 1938 to 12s. in 1942, to 12s. 9d. in 1943 and for 1944 was 13s. 6d. Per train mile the average receipt rose from 13s. 2d. in 1938 to 22s. 1d. in 1942. For 1943 and 1944 it was 23s. 10d. and 24s. 8d. respectively. The average wagon loads at starting point for all freight showed relatively small improvement from the 1938 figure of 7.28 tons. For 1942, 1943 and 1944 they were respectively 7.49, 7.47 and 7.41 tons. The greatest improvement was shown in merchandise loading which increased from 2.99 in 1938 to 4.27 tons in 1944.

As might be expected, there was a marked decline in the speed of train operation, both passenger and freight, during the war years, and the poor quality of the coal supplied to the companies is at least partially responsible for the fact that coal consumption per engine mile rose continuously every year from 52.50 lb. per engine mile in 1938 to 64.35 lb. in 1944. Loaded wagon miles rose from 3,003 millions in 1938 to 4,064 millions in 1944, but it is a matter for congratulation that, despite this large increase, empty wagon miles did not exceed the pre-war figure in any year, and in 1944 they totalled 1,427 millions compared with the 1938 figure of 1,492 millions.

The general shortage of labour and materials is also shown by the fact that the number of miles of track renewed declined from 1,485 in 1938 to 946 and 953 in 1940 and 1941 and 969 in 1944. In 1944 only 2,832,510 sleepers and 156,169 tons of rails were used, compared with 4,485,852 sleepers and 221,618 tons of rails in 1938. It is pointed out that the large reductions in the quantities of materials used and miles of track renewed during the war give a broad reflex of the arrears of track maintenance brought about by the shortage of labour and materials.

The Cast-Iron Plate Sleeper

OF recent years the concrete sleeper has been much in evidence as a substitute for the timber variety, but even in the United Kingdom it is not alone in the field. Metal sleepers have been and are being tried, and, as recorded elsewhere in this issue, the cast-iron plate sleeper has now made its appearance in this country, where scarcity of timber has put the iron and steel manufacturers on their mettle. As a result, at least one well-known British firm is producing five types of plate sleeper, four of them for main-line track, one of which is suitable where track-circuiting has been installed. Some of this latter type are on trial in the up local road on the L.M.S.R. main line between Cheddington and Tring. They are designed for use with bull-head rails and have timber tie bars between the plates. Other types have steel tie bars, some being for bull-head and others for flat-bottom rails. The fifth type is for narrow-gauge track. The L.M.S.R. is also

giving a trial to one of the steel tie-bar types on the Derwent Valley Light Railway near Tayerthorpe in Yorkshire.

The general design of all five types appears to be based initially on the variety of cast-iron plate sleepers widely used in India since the beginning of this century, successors to the original pot or inverted-bowl type dating back still further. Though they vary in detail design and in their fittings, all these Indian plate sleepers depend on a metal tie bar for retention of correct gauge. Among the earlier and best-known are the "D. & O." (Denham & Olphert) plates, on which, however, more recent types claim to be improvements; several of these types are peculiar to individual railways. However, most broad-gauge systems use one or more of them and they have also been installed on metre-gauge lines.

The principle of all the designs is that there are two castings integral with which are jaws to house the various types of rail. Tapered and split cotters passing through the tie bars lock them to the plates and also provide adjustment to gauge. Plate sleeper track has been shown by experience to have the advantage of long life, but Indian types are unsuitable for track-circuited sections of line, and for this and other reasons, so far as we are aware, have not been tried in Europe or the American continent. It is to provide this and other countries with a reliable metal sleeper akin to Indian types, in these days of acute shortage of timber, that Guest, Keen & Nettlefolds Limited has designed and produced the various types of cast-iron plate sleeper we now describe, to suit all requirements, including track-circuiting.

New Zealand Government Railways

THE report on the working of the New Zealand Government Railways for the year ended March 31, 1945, records a substantial decrease in gross revenue at £14,459,750, a decline of £865,556 or 5.65 per cent. compared with the previous year. The decrease, which occurred principally in passenger traffic, was due in some measure to altered war conditions, resulting in a substantial decline in the return from Armed Services' fares and freights. This decline would probably have been more than compensated for by other traffic had it not been necessary to operate restricted services throughout the year on account of the inadequate coal supplies, and having regard to these factors the revenue earnings are considered as satisfactory. Expenditure for the twelve months amounted to £13,260,277, an increase of £502,941, or 3.94 per cent. The rise in expenditure was due principally to two factors—the cost of implementing the decisions of the Government Railways Industrial Tribunal, and the increase (except in the case of coal) in both the quantity used and unit costs of materials and supplies.

The net revenue of £1,199,473 showed a decrease of £1,368,497 (53.29 per cent.), compared with 1943-44; the net return on average capital was 1.69 per cent., as compared with 3.71 per cent. last year. Excess of interest charges over net revenue was £1,642,926.

The operating results for the past five years are as follow:—

Year ended March 31	Earnings £	Working expenses £	Net earnings £	Net earnings per train mile d.
1941	11,160,218	9,465,574	1,694,644	22.78
1942	11,938,338	10,056,034	1,882,304	25.43
1943	14,128,993	11,302,413	2,826,580	37.98
1944	15,325,306	12,757,336	2,567,970	32.87
1945	14,459,750	13,260,277	1,199,473	14.09

The coal supply has been most difficult throughout the year, notwithstanding the reduction in train mileage resulting from restricted train services. The total quantity of coal consumed by locomotives fell from 634,007 to 576,926 tons. The consumption of hard coal decreased by 79,111 tons, but that of soft coal increased by 22,030 tons, thus making a net decrease of 57,081 tons. The present indications are that the coal position will not appreciably improve during the coming year.

The decision of the Government that the railway organisations should have their claims for improved salaries, wages, and conditions decided by an independent tribunal was implemented during the year. The additional cost of decisions of the tribunal for the year under review is estimated at £752,190. For a full year it is estimated that the additional cost to both working and capital expenses will be £1,114,800. It is expected that revenue will remain almost stationary, but that in consequence of the general increase in salaries and

wages, expenditure will show a sharp increase, resulting in a net revenue return of little more than half that realised during 1944-45. The question of increasing charges has been considered, but, having regard to the interests of stabilisation, it has been decided that no increase should be made in the meantime.

The introduction of rail cars has proved popular with the public, so much so that the accommodation on the single-car units has been found to be too limited. Consequently, it is not proposed to extend the single-unit rail car services, but to concentrate on the provision of three-car diesel-electric sets, both articulated and non-articulated. Inquiries have been made of various British manufacturers for eleven of the former type sets which will seat 120 passengers and for fifteen of the latter type sets which will seat 156 passengers.

Standard Form of Civil Engineering Contract

THE civil engineering profession and industry in this country have long felt the need for some common form of general conditions under which contracts for construction works could be carried out. Admittedly, civil engineering works vary so widely in nature, design, and constructional requirements that standards in any general sense cannot be applied to them, but it has now been found possible to direct the application of standards in particular respects to such works to the satisfaction of everyone concerned. After long and detailed discussion between the profession, as represented by the Institution of Civil Engineers, and the Federation of Civil Engineering Contractors on behalf of the industry, this important result has been achieved by agreement of a set of General Conditions of Contract and forms of tender, agreement and bond, approved and recommended by both those bodies for general use. This recommendation has been specially extended to Government departments, local authorities, and other employing authorities.

This noteworthy step forward, which is in the shape of a standard form of contract, aims at clarity and logical order in the arrangement of the conditions, and the avoidance of ambiguities of wording in forms of contract. It also has as its objective the elimination of uncertainties with which tendering contractors are faced by reason of the requirement that they shall undertake at their own cost obligations, the value of which cannot be measured beforehand, and the pricing of which, therefore, is largely speculative. The new form also makes a point of distributing the incidence of unpredictable risks inherent in works below ground level.

The new conditions also provide that settlement of disputes between employer or engineer and the contractor shall be submitted, without reservation, to independent arbitration, but they rule that, pending completion of the work, the engineer's decision on any such question shall be final and shall be complied with by the contractor; also that no delay shall be allowed to occur in carrying on the work. The decision as to whether the contractor shall be entitled to extra payment for compliance with such a decision by the engineer rests with the arbitrator. In this way possibility of dispute, it is hoped, will be reduced, and reasonable differences of opinion, by the exercise of commonsense on both sides, should be prevented from being taken to a court of law. Incidentally, the new conditions of contract contain *inter alia* an important ruling that bills of quantities should be prepared and measurements made in accordance with the report of the Committee on Engineering Quantities, issued by the Institution of Civil Engineers in 1933.

We welcome this concerted action by the profession and industry, especially as it is confidently expected that the standard form of contract will make for cheaper prices by the reduction of the speculative element and fairer distribution of risks. These improvements certainly should enable a tender to approximate much more closely to the real estimated cost of the work, and lead to closer and more truly competitive tendering, because it will be based on real prices and not on uncertain potentials. Copies of the new form of contract, the full title of which is "General Conditions of Contract and Forms of Tender, Agreement, and Bond for use in connection with Works of Civil Engineering Construction," are obtainable either from the Institution of Civil Engineers, Great George Street, London, S.W.1, or from the Federation of Civil Engineering Contractors, Romney House, Tufton Street, S.W.1, price 2s. 6d. each.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Queensland Government Railways

Hampstead, April 8

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—The article published in your issue of April 5 shows that a large volume of transport can be performed over a railway of 3 ft. 6 in. gauge. There was, however, nothing exceptional about the increase in the average daily mileage of goods wagons from 29 to 53 during the war. As stated in the report, the average for American wagons in 1939 was 36 miles, but the distance advanced to 52 in 1944 and there are 1,770,000 wagons in America as compared with 21,000 in Queensland.

As a separate point, perhaps you would be kind enough to explain how the figures for passenger journeys quoted in the text of your article are to be reconciled with the numbers of passengers carried given in the table of working results.

Yours faithfully,
STATISTICIAN

[Passenger journeys on the Queensland system, as stated in the text, were 38,534,318, but thanks are due to our correspondent for detecting an error in the table, which should have been seen in reading the proof of the article. The table, which was reproduced from the report, gave passengers carried as 18,081,234, but this excluded season-ticket holders.—Ed., R.G.]

Electric Train-Motor Horsepower

London Passenger Transport Board,
Boile Lane, Acton.

London, W.3. April 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—I have noticed the discussion on the horsepower of motors fitted to the Southern Railway electric trains. It would seem to me that too much stress is being laid on the horsepower. The position is far more complicated than can be expressed in these simple terms. Electric motors, particularly for traction work, have two "ratings," commonly expressed in terms of horsepower—a "one-hour rating" and a "continuous rating."

The "one-hour rating" represents the power which the motor will deliver when run on a test bed for one hour, without exceeding a pre-determined temperature rise which is based mainly on the character of the insulating materials used. This rating is a test bed rating only, and is useful (in so far as train operation is concerned) only as giving a basis from which can be estimated the maximum current which may be used during acceleration, when a motor may be expected to give 25 per cent. more power than its "one-hour rating" figure.

The "continuous rating" is the power which the motor will deliver continuously, when in a clean condition, on a test bed without exceeding the temperature rise referred to above. This may be related, with proper allowances for the accumulation of dirt and other matter in the ventilating ducts, to the total energy consumption per hour per motor of practical train operation. The relationship between continuous and one-hour ratings of motors varies according to the system of ventilation adopted—varying from a poor ratio with semi-enclosed motors, through a better ratio with self-ventilated motors, to a still further improved ratio with force-ventilated motors (as used on electric locomotives).

The necessary train performance when working short sections is dependent to a great degree on the acceleration from rest which the train can achieve. Provided that the motors are in fact sufficiently large, the maximum acceleration is determined solely by the grip which the train can exert on the rails, multiplied by the proportion of the total weight of the train which rests on the driving wheels. Any attempt to exceed the maximum acceleration so determined must result in wheel slip. The adhesion between rail and wheel is greater with cast iron brake blocks than if non-metallic blocks are used, so that with non-metallic blocks it is necessary to motor a somewhat larger proportion of the weight of the train, i.e., to use more motors which may be of smaller size.

The question of the speed of the motor and the gear ratio between the motor and the driving wheels also comes into the picture. With a sufficiently low gear ratio, a very small motor could produce for a short period the maximum acceleration, but could not maintain this acceleration for a practical time to get the train up to a reasonable speed without the motor having to run too fast for satisfactory operation, either electrically or mechanically. The gear ratio,

therefore, and the motor power, which must be regarded as interconnected, are determined by the acceleration required and the maximum speed desired of the train.

The characteristic of a traction motor is such that the torque exerted falls off as the motor speed increases until a balancing speed is reached, at which the power of the motor is entirely absorbed in overcoming the resistance to the train due to friction, windage and grade. If the motors are too small, this may occur before the desired maximum speed is achieved. It will be seen, therefore, that it is not practicable in any simple way to consider the power of motors installed on a train without having a full knowledge of the performance of the train required, i.e., acceleration, maximum speed, distance between stops, lay-overs, and so on.

During acceleration, the current through the motors is maintained as long as possible at a maximum value by the control gear and then falls away with decreasing acceleration until current is cut off or a balancing speed is achieved. Electrical heating effect is proportional to the square of the current (ampères). When current varies, the heating is proportional to the mean of the squares of the currents values from moment to moment, e.g., if at two moments the currents are, say, 200 and 100 amp., the heating is not proportional to—

$$\frac{(200 + 100)^2}{2} = 150^2 = 22,500, \text{ but to—} \frac{200^2 + 100^2}{2} = \frac{40,000 + 10,000}{2} = \frac{50,000}{2} = 25,000.$$

In other words, periods of high current have a disproportionate heating effect. With trains frequently starting, as on short section lines with signal checks, the heating effect of the current (to be related to the continuous rating) is high compared with that for trains having longer runs. For this reason, a higher continuous rating per horsepower per ton of train is required than for a through running train. In addition, a greater capacity for acceleration is required, since the short section train has to be injected between the through service trains, with no means of making up any lost time other than higher acceleration whenever not prevented by the preceding train, since the short sections do not permit of high speeds being reached.

It is, of course, possible to design motors for specific trains on specific services, to give the most economical result both in power consumption and in capital cost, but the effect of this would be to make rolling stock and/or motors non-interchangeable between services, while the variation in cost of a motor is in no direct way proportional to the variation in power.

Yours truly,

W. S. GRAFF-BAKER
Chief Mechanical Engineer (Railways)

Lessons from Accidents

7, Birch Grove,

Harrogate, April 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—Reviewing the reports, letters, and so on, concerning the recent accidents at Ecclefechan, Haywards Heath and Bourne End, one factor is common to them all, that is to say, the major witnesses whose actions at the time are very difficult to understand were killed. Therefore it appears useless to indulge in what is no more than mere idle speculation as to the causes; the elimination of all possible chances of recurrence should be stressed most strongly.

A great deal of support is given to the arguments of A.T.C. enthusiasts by the Ecclefechan accident due to signals being ignored, but, in the case of Bourne End, another variation of automatic control seems desirable so as not to depend entirely on the human element and the observance of special rules.

With the increased application of colour light signalling it seems desirable that signal aspects, especially for secondary movements, should be standardised throughout the country, as one may find instances where drivers, especially at large sheds, work over routes using more than one system. This often leads to confusion; more so when "road learning."

Referring to the remarks by your correspondent, Brigadier W. G. Tyrrell, and his suggested rule book alterations; although agreeing that such additions would assist in safer working when speed restrictions or diversions are in force, they still lack that element of security against any mistake on the part of the signalman or lapse on the part of the driver.

Some form of control is required, therefore, which would be instantaneous in the event of failure of the human element, and flexible enough for application to everyday traffic conditions, guarding against all contingencies arising therefrom, and giving positive security in emergencies.

Yours faithfully,

J. SLEE

The Scrap Heap

Last year 351,318 passengers took advantage of the interavailability arrangements in operation between the G.W.R. and its associated road companies. This is an increase of 68,204 over 1944 and 300 per cent. over 1933.

Mr. Barnes at the Signals



The Minister of Transport at the signalling demonstration at Euston (see p. 441)

HIGH LEVEL CONFERENCE

A man climbing up the girders of the new 300-ft. high Howrah Bridge was noticed by the police and persuaded to come down. Taken to the police station, he explained that he had been 3 days without food and thought he would meet God at the top of the bridge to inquire why this had happened. The man, who is 25, is believed to be insane.

In another recent case, two men found at the top of the bridge explained that they had gone up to play cards.—From "The Statesman."

UNDERGROUND TRAVEL

It is amazing that the Germans never discovered the one sure way we had of getting men and materials into and out of Oslo, in Norway—by means of tank cars on the railroad running from Stockholm to Oslo. If we wanted to send some guns or explosives to the Norwegian underground we could always arrange with Swedish engineers and trainmen to see that they were not discovered *en route*. More than one prominent figure travelled in the interior of an oil tank car; Jens Christian Hauge, now Norwegian Defence Minister and then the leader of the underground, made the trip several times. The only time a traveller had to be concealed in the interior was while at a station or going over the border. The rest of the time he could ride on the engine.

The most interesting trips these underground agents made were in the water tenders of the locomotives. Obviously, they couldn't get into the tenders without some sort of protection, or they would freeze to death; and the water could not be too high or they would drown. So they made the journey in diving suits, with the front of the helmet unscrewed so they could breathe. That was absolutely safe, and the Germans never suspected.—From an article, "Our Secret War in Scandinavia," in "Collier's."

100 YEARS AGO

From THE RAILWAY TIMES, April 18, 1846

ENGLISH, SCOTTISH, AND IRISH RAILWAY SHAREHOLDERS' PROTECTION SOCIETY.—This Society, consisting of Scripholders representing a considerable amount of Stock in different Companies, as specified in last Saturday's RAILWAY TIMES, is formed for the adoption of combined measures to effectuate the salutary objects of the Premier's proposed R. & L. Bill, of the details of which the earliest information is secured. The Society has also exclusive statistical and other information respecting the various schemes. Scripholders in any of the now abortive projects, desirous of concurring in the proposed measures, may be registered on forwarding a proper authority to the Secretary, Samuel Rowlett, Esq., Solicitor, 43, Lamb's Conduit-street, London, and payment of the registration fee. It being obvious that, the more extensive the union the more beneficial must be the result, the Society suggests the importance of immediate meetings of Scripholders resident in the provinces, and their co-operation with the Society by means of a professional Agent of their own appointment. The registration fee is, for any number of shares in a scheme—

Less than 20	5s. 0d.
20 and less than 50	10s. 6d.
50 and upwards	21s. 0d.

MORE TRAINS: Commentary by Giles



"I know one bloke who ain't wildly enthusiastic about these 'ere extra trains"

[Reproduced from the "Daily Express"]



Company Manners

The why and how of keeping old friends and gaining new ones

New York Central System

The New York Central system has issued a booklet entitled "Company Manners," the front cover of which is reproduced above. It is addressed to men and women of the New York Central, and Mr. Gustav Metzger, the President, in a foreword writes:—

"Recently a prominent business magazine asked readers to name the railroad they considered most courteous. The voting places New York Central up among the highest ranks in railroad courtesy. That is a great compliment to the 136,000 men and women of New York Central. It holds far reaching promise for future security and progress, because we are in the business of selling service. Public Goodwill is therefore one of our most important assets."

"To provide faster, safer, more comfortable and dependable post-war transportation, your Railroad invests millions a year in new equipment and research. In the designing rooms and testing laboratories finer trains for tomorrow are taking shape today. Yet just as important as these technical advances are the Public Relations round-table classes now going on all over the railroad. Some 25,000 men and women from every department have already enrolled. And more are joining daily."

"Out of those discussions have come new ideas to make us not only a more efficient, but also a more thoughtful, helpful and courteous transportation team. With thanks to the men and women who developed them, your railroad now presents many of those ideas in this booklet. So, in the truest sense, it is a handbook of our 'Company Manners' to help us win friends and prosperity in the years ahead."

WAGONS "WATERPROOFS"

Some 500 miles of 36-in. canvas were used last year by the G.W.R. in the manufacture of tarpaulin sheets for its goods wagons.

TAILPIECE

Of all the things I once enjoyed
And almost took for granted then,
A few return, my hopes are buoyed
That others will come back again;
One pointer to the joys in store:
The "Golden Arrow" rides once more.

Such pictures in my fevered brain
Of journeys to the heart of France
And conjured by that gleaming train;
To Avignon, to old Provence:
Just at the time when spirits flag
Romantic labels on my bag.

Yet I must dream before I build
For dreams much more substantial things,
My mind with future hopes are filled
As to fair France my memory clings;
Of all the names I can't resist
The "Golden Arrow" heads the list!

A. E. C.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

WESTERN AUSTRALIA

Staff Locking of Facing Points

As a safeguard against derailment of fast-moving trains on the Eastern Goldfields line, electric staff locking was recently installed on all facing points at intermediate sidings. Approval has now been given for similar work to be carried out immediately on the Great Southern Railway, and between Northam and Mullewa on the Northern system. The estimated cost involved is £9,500. The use of this equipment will avoid the possibility of points on main lines being left set for sidings, and it is considered the additional protection afforded by this means amply justifies the proposed expenditure.

Lounge Cars on "Westland Express"

Lounge cars have been restored to the "Westland Express," which is the Western Australian link in the interstate train service between Perth and the Eastern States capitals. The cars have returned from war service. They were taken over by the Department of the Army early in 1942, for use as ward cars on the special hospital train prepared in readiness for possible large scale use. These cars did good service in the transport of sick, wounded and injured servicemen in this State, and now, refitted with civilian accessories, they have resumed their peacetime occupation.

COLOMBIA

New Railway Projects

Three new railways or rail connections are at present projected, namely:—

(1) The construction of the final link in the line of rail communications between Bogotá and its nearest Pacific port, Buenaventura, from Ibaque to Armenia, over (or under) the 11,000-ft. Quindo Pass. The distance from Bogotá to Buenaventura is approximately 450 miles and there is a railway throughout, with the exception of the Ibaque—Armenia gap, about 30 miles as the crow flies. This rail gap is at present filled by mechanical road transport over the pass. Survey has shown, however, that 95 miles of railway will be required to complete the line even with heavy grading, and the estimated cost is about £2,500,000.

(2) A most ambitious project to complete a 525-mile rail connection between Bogotá and the Caribbean port of Concha on the southern shore of Lake Maracaibo in Venezuelan territory. The first section of this route will be the existing 135-mile Northern Railroad from Bogotá to Barbosa, and the second will be a 143-mile new construction from Barbosa to Bucaramanga. Onwards, the line will be constructed to Cucuta, on the Tescua Petrolea railway, and the Colombia—Venezuela frontier will be reached at a point 450 miles from Bogotá. The last 70 miles or so will be in Venezuelan territory. The ruling grade on this route is expected to be 1 in 33.

(3) The third projected line will connect the Colombian Caribbean port of Cartagena with Bolombola on the Cauca River near the city of Medellín. This railway will eventually connect the existing lines centred upon Cartagena with the main railway system of the country, and will presumably, in the main, follow more or less closely the Cauca River. Its length will be about 380 miles and the

estimated cost is stated to be some £3,750,000. Though work is to begin shortly, its completion is not expected within about 10 years. The gauge of all these lines, in order to conform to that of the existing lines, will be either 3 ft. or 1 metre.

BRAZIL

Guarapuava Extension

The Rede Viação Paraná—Santa Catarina has inaugurated another section of its Guarapuava extension between Inacio Martins and Gois Artigas, 30 km. long, making a total of 95 km. of line now open for traffic.

South American Railway Map

In accordance with a motion approved at a meeting of the Executive Committee of the Pan-American Railway Congress for the modernisation of the map of the railways of South America, and its amplification to contain all the railways of the southern continent, a circular has been sent to the Permanent International Commissions of Uruguay, Columbia, Chili, Brazil, Mexico, Peru, Venezuela, and Ecuador, and to the Ministries of Transport and Public Works of Paraguay, Bolivia, and Argentina, asking for an up-to-date map of all the railways in traffic. It is requested that the characteristics of each railway, particularly with reference to alignment, gauge, and extensions, and whether worked by the State or by private enterprise, should be stated.

CHILE

Credit for Electrical Purchases

The Export-Import Bank of the U.S.A. has approved an increase of \$800,000 to an existing credit of \$2,000,000 made available in July, 1945, to the Electrical Export Corporation for the shipment of electric locomotives and associated electrical equipment to the Chilean State Railways. The 116-mile electrified line of this system between Santiago and the seaport of Valparaíso carries most of the import and export trade of the country. The existing equipment on the line has been in use for 23 years, or 3 years more than its estimated useful life, and carried a much increased load during the war years on account of shortages of petrol and lorries. Freight has been accumulating at stations in the south of the country more rapidly than it can be moved, and damage has resulted to perishable commodities.

UNITED STATES

Wagon Records by Teleprinter

The New York New Haven & Hartford has installed a teleprinter system between the marshalling yards at Maybrook, New York, and Cedar Hill, Connecticut, whereby reports of train compositions and wagon loadings are made immediately available in punched card form. At the transmitting end, cards are punched from the waybills in the ordinary way. They are then passed through a tape-cutter which produces the perforated tape required for telegraphic transmission. This machine simultaneously prints copies of the information for local use. Such copies, required in the yardmaster's office, for example, for marshalling outgoing trains, previously had to be transcribed by hand.

The tape is then passed through a telegraph transmitter, and a duplicate copy is

produced at the receiving end, from which cards identical with those originally made out can be produced automatically. By this means full information regarding incoming trains is received several hours before their arrival, instead of having to wait for the waybills to come in by train.

INDIA

Flying Squads to Check Lawbreakers

To put an end to lawlessness caused by ticketless travellers, the Government of Sind has prepared a scheme according to which a special armed force, consisting of five flying squads, will travel by certain trains and work in conjunction with the railway staff.

Ticketless Travellers Refuse Fines

Of 1,742 persons convicted for travelling without tickets and otherwise disregarding regulations during February, 1946, by Mr. Riaz Kureishy, Special Magistrate, N.W.R., 31 were sent to jail because they refused to pay fines. Fines collected from 1,711 persons amounted to Rs. 11,963.

KENYA & UGANDA

Lake Steamer Loses Propeller

Another lake steamer, the ss. Nyanza, has lost a propeller, probably as a result of the present low water level in Lake Victoria. The Nyanza had been chartered by the military authorities since 1942. Another vessel formerly on military charter, the ss. Rusinga, has had to be handed back to the Administration to replace the ss. Usoga, which, as reported in *The Railway Gazette* of February 22, lost a propeller and suffered other damage early in the year. The Nyanza is now maintaining a reduced service at low speed.

When lake levels are low navigational difficulties are greatly increased and ships leaving and approaching Kisumu have to push their way through some 9 miles of soft mud. Cargoes have had to be limited to reduce the draft and there have been occasions when a ship, after it has been brought to a standstill, has had to be partly offloaded. On one occasion the ship was held to the bottom by suction and had to be almost completely offloaded. This ploughing through soft mud places a heavy strain on the propeller shaft and the propellers.

Short-Wave Radio Sets

Radio communication was first established with short-wave equipment between Headquarters and the ss. Robert Coryndon on Lake Albert and the ss. Lugard on the West Nile (plying between the north of Lake Albert and the Sudan border) in 1933. From 1936 onwards radio communication was extended to include all vessels, other than small tugs, on Lakes Victoria and Kioga. All ships can now maintain contact with each other, with land stations at Kampala and Masindi Town in Uganda (the headquarters of the railway road transport services connecting Lakes Kioga and Albert) and with Headquarters at Nairobi. It is noteworthy that the installation is entirely the work of one of the Administration's officers, who not only built up the transmitting equipment, but personally carried out the installation and is responsible for the whole of the maintenance in addition to his normal duties as an Accounts Officer. The operators are Africans who have been trained locally; they show considerable aptitude for the work. With the more intensive use of all units of the fleet, brought about by the expansion of wartime traffic, radio communication has been invaluable.

British Metal Plate Sleepers

A description of six types of British-made cast-iron plate sleepers and their advantages

THOUGH the use of the cast-iron plate sleeper is common practice in India, it has not found favour in the United Kingdom, partly because its metal tie rod made it unsuitable where track-circuiting was installed. To obviate this difficulty and place on the market a reliable metal sleeper to suit all requirements including track-circuiting, bull-head or flat-bottom rails and any gauge or rail section, the well-known firm of Guest, Keen & Nettlefold, Limited, has now designed and produced six varieties of plate sleeper, some of which are already being tried by a British main-line railway. (See editorial in this issue).

The following is a description of these types:—

Type A—For track-circuited standard-gauge bull-head track.

This type of sleeper forms the subject of the second drawing reproduced herewith. It will be noted that it consists of two C.I. plates integral with which are cast the chair jaws and strengthening ribs. Also, that the dimensions of each plate, 30 in. ×

measured shovel packing. The fin or rib designed to preserve alignment has been located at the extreme outside edge of the casting, nearest the cess and six-foot way. It is, therefore, in the most accessible position for freeing when small adjustments for line become necessary.

Types B & C—For standard-gauge track with bull-head rails, not track-circuited.

In both these types the castings are similar to those in type A, except that the box to take the wooden tie bar is replaced by a raised platform in the casting to take a steel tie bar, as shown in the illustration of Type C. Each end of the tie-bar is secured in its plate by two 2½-in. × ¾-in. bolts. In Type B the tie bar is on the flat, but in Type C it is on edge; otherwise the two types are identical.

Types D and D1—For standard gauge track with flat-bottom rail, not track-circuited and also track-circuited.

These plates are similar to those in Types A, B and C, except that the bull-head rail jaws are replaced by jaws suitable for flat-bottom rail. The tie-bars and fasten-

the wooden tie bar complete is slightly heavier than an 8-ft. 6-in. × 10-in. × 5-in. soft-timber sleeper fitted with standard cast-iron chairs, secured to the sleeper by either chair screws or chair bolts. The weight is, however, concentrated under the rails, a desirable feature. The weight of either Type B or C with steel ties is approximately equal to that of such a timber sleeper.

The weight of the complete sleeper for 75-lb. flat-foot rail is approximately 160 lb., but for heavier sections may be as much as 200 lb. The weight of the narrow-gauge sleeper complete for light section flat-foot rail is 45-50 lb.

Strength and Life

Severe breaking tests have been carried out on both the bull-head and flat-bottom standard-gauge plates. The tests have proved that each individual plate has a safety factor of at least 100 per cent.

These cast-iron sleepers will last 100 per cent. longer than their wooden counterparts and, therefore, there will be a marked saving in labour and material for renewals.

The castings are made with such accuracy that the tie-bars can be supplied either bored in the case of timber or drilled or punched in the case of steel, and correct gauge can be assured. The com-



Type A plate sleeper with wooden tie-bar suitable for use in track-circuited sections, as laid between Cheddington and Tring, L.M.S.R. main line

10-in., are equal to those of that part of a 10-in. timber sleeper, which in modern standard practice, is packed, 15 in. on each side of each rail centre, leaving its ends and centre free. With the G.K.N. plate sleeper centre-binding is impossible. The wooden tie-bar connecting the plates is tapered at the ends to fit the C.I. box on the plate and secured by two ¾-bolts at each end which are locked in the vertical position in specially-provided slots in the top of the box by two mild steel galvanised plates. The wooden tie-bar has a section 80 per cent. less than that of the ordinary wooden sleeper, thus effecting great economy in timber. Moreover, a much greater percentage volume of wood can be impregnated with preservative.

The longitudinal and transverse fins or ribs are located away from the centre of the plate, insuring an even and unopposed distribution of packing ballast no matter whether the method is shovel, beater, or

ings are also similar. The rail is secured in the chair jaws by a double taper steel key which locks the inside foot of the rail securely in the inside jaw of the casting; this jaw is tapered to suit the key. If gauge-adjustment is required, wide jaws and the use of two tapered keys for each chair are recommended. Gauge is assured with one tapered key by the distance between the holes in the tie bar.

Type E—For light-section track suitable for gauges from 1 ft. 9½ in. to 3 ft. 0¼ in. with flat-foot rails.

Sleepers of this type were designed and produced primarily for use on narrow-gauge underground tracks in collieries, but they are equally suitable for similar conditions on the surface.

With Types A, B, and C, Mills patent spring-steel keys are recommended by the manufacturers. Their use is standard practice on the British main lines.

The weight of a Type A sleeper with

plete sleeper, therefore, can be made up, readily inserted in the track, and the rail positioned in the jaws and keyed up. With the plate sleeper, relaying or re-sleepering can be carried out with minimum possession of the line. Individual plates can be inserted under each rail in traffic and the ties fitted afterwards.

Maintenance Advantages

The following maintenance advantages are claimed for this type of sleeper:—

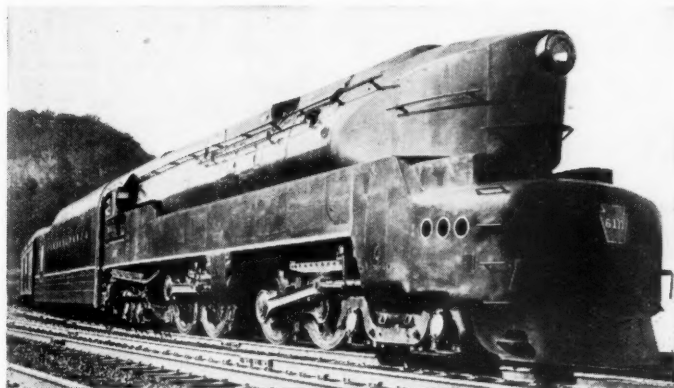
1. Little or no opening out of ballast between the sleepers will be necessary to get at the underside of one of these sleepers when packing is required. The jack can be inserted, the rail lifted the required amount and the necessary packing material inserted under the sleeper.

2. Apart from the keys—and they do not come out in service—there are no fastenings in the vicinity of the rails. With

(Continued on page 432)

Four-Cylinder Duplex Locomotive for the Pennsylvania Railroad

New 4-4-4-4 locomotive develops 6,500 i.h.p. at 85½ m.p.h. at a steam rate of 15.4 lb. per i.h.p.-hr.



ABOUT three years ago the Pennsylvania Railroad put into service a new type of locomotive of quite exceptional significance and interest to locomotive engineers, for it represented an entirely new approach to the problem of providing sufficient power to move very heavy trains at extremely high speeds, at the same time keeping down piston thrusts to reasonable figures. The history of the idea, originally proposed by Baldwins in 1932, has been very ably told by Mr. Ralph P. Johnson, Chief Engineer, Baldwin Locomotive Works, in a paper which he presented to the New York Railroad Club on May 17, 1945; and the paper is all the more valuable because it gives, in considerable detail, the results of tests carried out on engine No. 6110 during 1944, after this locomotive had completed a mileage of about 120,000 in two years' service. Many of these results are condensed into highly informative characteristic curves, instead of being spread out in tabular form.

The Fundamental Aim

The fundamental aim in the new design was to obtain the equivalent of the 4-8-4 locomotive, which has found very wide acceptance in the U.S.A., as an extremely useful type, applicable to both passenger and goods trains, and over either level or mountainous country. One of the drawbacks of these big engines is the magnitude of the piston thrusts (in many such machines, with boiler pressures around 275 lb. per sq. in., the piston thrust reaches 160,000 lb.) so that very large crankpin bearings are essential. Yet loading-gauge clearances, and the limitations of the available space in the wheel centre, conspire to defeat this simple method of disposing of large piston thrusts. With four cylinders, however, the piston thrust can be halved; heavy moving parts are obviated, and smaller big-end bearings can be permitted.

The disposal of the cylinders and wheels on the new 4-4-4-4 locomotive makes it look, at first sight, as if it were an articulated machine, but such is not the case. Articulation was not desired, for it is not suited to high speeds, as the front unit is not sufficiently stable, spring-centring devices not proving to be effective against slight lateral displacements. Moreover, the hinged connection between front and rear units always has been a heavy maintenance item. The new design, therefore, involved a rigid frame, with the rear cylinders

between the two groups of driving wheels.

There are several advantages in this arrangement (which has been called the "duplex" type) over others which have been either proposed or tried. It permits a comparatively short stroke, as less strength is required for axles and crankpins, and the resulting smaller diameters allow them to be spaced more closely in

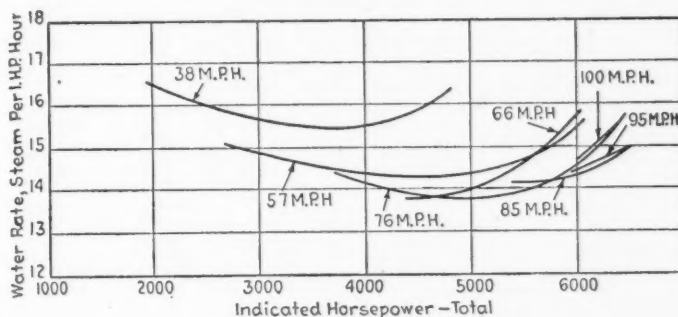


Fig. 1—Steam per indicated horsepower-hour

the wheel centres, so that lower piston speeds are obtained. Also, the simplest type of connecting and coupling rods can be used, as contrasted with the arrangements typical of the 4-8-4 type. The splitting of the driving wheels into two groups reduces machine friction, thus giving a higher drawbar pull, especially at high speeds. The improved ability to handle steam through four valves (whether piston or poppet) is a great advantage.

An experimental four-cylinder locomotive of this type, class "S-1," built at Altoona in 1939 for the Pennsylvania Railroad, and exhibited in that year (and again in 1940) at the World's Fair in New York, was useful in providing experience with the four-cylinder rigid-frame design. The next type, class "T-1," which forms the subject of this article, was ordered on July 30, 1940, and delivered on April 22, 1942. It was designed to haul 880 tons at 100 m.p.h. on level track, and to evaporate a maximum of 85,000 lb. of water per hr. At first, piston valves were considered, but tests with poppet valve gear on a 4-6-2 (class "K-4s") locomotive on the Pennsylvania Railroad, showed at least 20 per cent. improvement in efficiency, so poppet valves were adopted on the new design.

The first test run with the new type involved a load of 14 coaches weighing 1,000 tons, which were hauled from Harrisburg to Chicago; the T-1 showed remarkable powers in the recovery of lost time. The train left Crestline, Ohio, 15 min. late and arrived at Fort Wayne, Ind., 5 min. early. Leaving Fort Wayne 3 min. late, it arrived in Chicago 10 min. early. From Crestline to Chicago the speed was consistently around 100 m.p.h. On another occasion, a 16-car train was hauled over a 69-mile stretch of the Fort Wayne division at an average speed of 102 m.p.h.

In April, 1944, exhaustive tests on the pioneer engine of this type were begun at Altoona; the test plant was rebuilt to accommodate the new locomotive. Tests were made at speeds of 38, 57, 66, 76, 85, 95, and 100 m.p.h., and at various cut-offs from 10 to 50 per cent., with full throttle. High-volatile Westmoreland County (U.S.) coal was used with all slack under ½ in. screened out; the calorific value was 14,123 B.Th.U. per lb., and the ash content 7.58 per cent.

The Davis formula for train resistance shows that a drawbar pull of 11,200 lb. is needed to haul a train of eleven 80-ton cars at 100 m.p.h. on level tangent track. In service the new locomotives have exceeded considerably this requirement, having hauled 16 cars at an average speed of 100 m.p.h. over typical stretches of track. The test-plant records show such a performance to be easily possible, a cylinder tractive force of over 25,000 lb. having been obtained at 420 r.p.m. (100

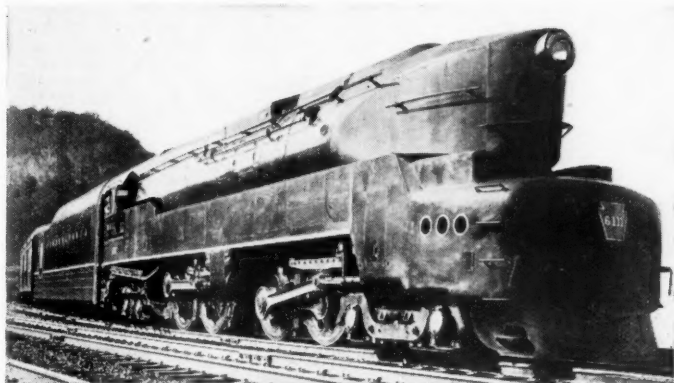
m.p.h.), which is considerably more than that required to haul the locomotive and 16-car train.

Some of the test results are of particular interest, bearing in mind the fact that the locomotive had run upwards of 120,000 miles at the time of the tests. The maximum capacity of the boiler was determined from a test at 100 m.p.h., full throttle, 20 per cent. cut-off, and a firing rate of 252.2 lb. of dry coal per sq. ft. of grate area per hr., when the evaporation was 105,475 lb. of water per hr. The boiler efficiency ranged from 65.5 per cent. when burning 50 lb. of dry coal per sq. ft. grate area to 43 per cent. when burning 240 lb. per sq. ft. of grate area. As in all locomotive boilers, the largest loss is in the fuel escaping unburned; this figure ranged up to 44 per cent., but the engine was rarely worked with such a loss, and then only for short periods.

Careful attention to the design of the steam passages reduced the pressure drop from the boiler to the steam pipe to only 9 lb. per sq. in. at maximum evaporation. Fig. 1 shows the steam per indicated horsepower-hour at various speeds. The minimum water rate was 13.6 lb. at 76 m.p.h. and 20 per cent. cut-off; in most tests

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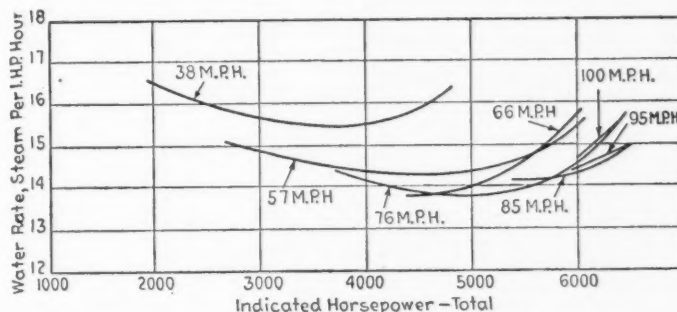


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it ranged from 14 to 15.5 lb. In forty years' testing at the Altoona test plant, this locomotive gave the lowest water-rate; the indicated horsepower was 40 per cent. higher than any other locomotive tested there. In addition, the maximum drawbar horsepower, 6,100 h.p. (Fig. 2) was 46 per cent. higher than any previously recorded at Altoona.

The low water rate can be attributed to the development of maximum power at early cut-off, made possible by (1) high boiler pressure, (2) low pressure-drop from boiler to steam chest, and (3) large admission valves. The mechanical efficiency, due to the use of poppet valves, and to roller bearings on the driving rods and axles, exceeds 90 per cent. at all speeds and horsepowers, and rose to 97.5 per cent. at 38 m.p.h. and 4,500 h.p.

These locomotives will out-perform a 5,400-h.p. diesel locomotive at all speeds above 26 m.p.h. (Fig. 3), and if given comparable facilities for servicing and repairing, will do the work more cheaply. The disparity in diesel and steam locomotive schedules is almost entirely due to coal, water, and ash handling delays. With careful planning and an expenditure of only a fraction of the amounts spent on diesel facilities, steam locomotive servicing can be accomplished during the normal passenger stop. Coal chutes swinging

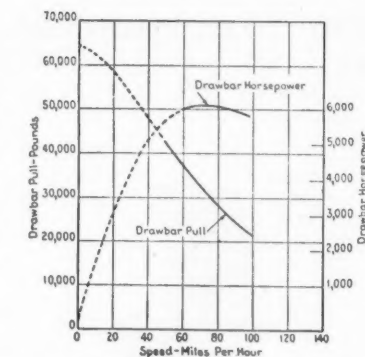


Fig. 2—Drawbar pull and drawbar horsepower corrected for a water rate of 100,000 lb. of steam per hour

lengthwise along the track, capable of dumping 43 tons of coal in 75 sec., have been installed. Water columns delivering 5,000 gal. per min. are also in use. Hoppers capable of holding the full accumulation of ashes can be installed under tracks with sluices to wash them away.

If such facilities are located at scheduled

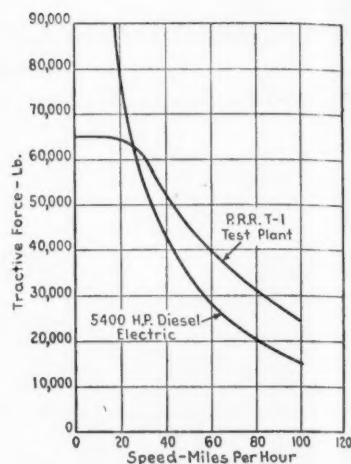


Fig. 3—Tractive force of Pennsylvania 4-4-4-4 locomotive, class T-1, compared with that of a 5,400-h.p. diesel locomotive

station stops, steam locomotives such as the new 4-4-4-4s can maintain schedules as fast as any demands may impose.

British Metal Plate Sleepers

(Concluded from page 429)

a wooden sleeper the fastenings on the outer rails of a curve are solely responsible for keeping the rails in position. In the plate sleepers those fastenings are in a position where they are subjected to the least possible strain. Consequently risk of derailment, especially on curves—such as may occur to the fastenings giving out in faulty timber—is thereby reduced to a minimum.

3. There are no screws or spikes to become loose; therefore, apart from very occasional bolt tightening, the only maintenance required will be lifting and packing. This will result in a steady yearly saving in labour and materials, especially on part-renewal of components and complete renewals.

4. Once the ballast has consolidated under the plates, the transverse (to the track) ribs will prevent longitudinal movement of the sleeper, and the longitudinal rib on the outside of each plate will prevent defects in alignment.

5. The only parts likely to require renewal during the long lifetime of the composite sleeper are the keys, the bolts, and the ties. In each case renewal can be effected readily and it can be made at very low cost.

6. Where drainage improvements are necessary, the substitution of the plate sleeper will reduce the excavation required by anything up to 4½ in. when bottoming out. Additional ballast can be provided to the extent of 4½ in. maximum without interfering in any way with the level of the track.

7. The G. K. N. plate sleeper offers a much greater resistance to creep.

8. The output from length gangs will be greatly increased, as the work of opening out and filling in will be almost completely eliminated. Again, when sifting the ballast between the sleepers to improve drainage, the depth of the ballast to be sifted will be reduced by 4½ in. These two items alone are claimed to represent an estimated saving of something like 25 per cent. of the average time of a length gang.

The standard-gauge types with either wooden or steel tie bars are considerably cheaper today than a new creosoted 8-ft. 6-in. × 10-in. × 5-in. timber sleeper fitted with new standard chairs and fastenings.

THOS. FIRTH & JOHN BROWN LIMITED.
—Thos. Firth & John Brown Limited states that the agency sales representation of the company, which has been in the hands of Power Units Limited, Swansea, for a number of years, has been concluded; and that it has appointed Mr. E. S. Gregory and Mr. W. J. Davies as its Sales Representatives in South Wales. It has also opened a branch office at 106, Bute Street, Docks.

RAW MATERIALS DEPARTMENT TRANSFERRED TO BOARD OF TRADE.—The transfer of the Raw Materials Department from the Ministry of Supply to the Board of Trade, announced some time ago, took effect from April 1. The address of the department now is I.C. House, Millbank, London, S.W.1 (telephone: Franklin 2211), and all inquiries (which hitherto would have been addressed to Shell Mex House) should be addressed there. Branches of the R.M.D. situated outside Shell Mex House remain at their present addresses, but under the Board of Trade. Responsibility for salvage and certain semi-manufactured and manufactured articles has been transferred at the same time. The following materials, hitherto dealt with by the R.M.D. will remain, however, with the Ministry of Supply:—Agates, antimony, arsenic metal, cadmium, carbon (graphite electrodes for furnaces), chrome cobalt, copper, columbite, diamond dies and tools, dolomite, fluorspar, lead, quartz crystals, tantalite, tin, foundry bending materials, grinding wheels (including abrasives), iron and steel and ferro alloys, magnesite, molybdenum, monazite sand, nickel, refractories, tungsten, vanadium, zinc. Joint Orders have been issued, entitled the Ministry of Supply & Board of Trade (Various Controls) (Nos. 1 & 2) Orders. It is provided that any relevant licences issued

before April 1 shall remain in force. By an Order in Council, also effective from April 1, the Board of Trade takes over the trading functions of the Ministry of Supply in respect of any transferred materials, together with any relevant contracts entered into by the R.M.D. on behalf of the Ministry, and the ownership of the stocks held by the department passes to the Board.

CHILEAN STATE RAILWAYS: RATES AND FARES.—Goods rates on the Chilean State Railways were increased by an average of 18 per cent. from January 1. First and second class passenger fares were increased by 10 per cent., and third class fares by 20 per cent., on the same date. The Chilean State Railways are reported to have shown an operating loss of 150 million pesos during 1945.

CONTROL OF NON-FERROUS METALS.—The Minister of Supply has made the Control of Non-Ferrous Metals (No. 22) (Copper, Lead & Zinc) Order, 1946, which revokes and remakes in consolidated form, with amendments, the Control of Non-Ferrous Metals (Nos. 11, 17 and 20) (Copper, Lead & Zinc) Orders, 1942-46, with Directions Nos. 1 and 2 under the (No. 11) Order. Under the new Order the maximum prices for copper, lead, zinc and zinc products are increased, as follow: copper, by £10 a ton; lead, by £6 a ton; zinc, by £8 a ton; zinc sheets, by £8 a ton; zinc oxide, by £7 a ton. The Order further provides that licences henceforward will be required for certain additional descriptions of lead. Copies of the Order (S.R. & O. 1946, No. 494) may be obtained from H.M. Stationery Office, York House, Kingsway, London, W.C.2, or through any bookseller, price 2d. The Minister of Supply has announced that, in view of the change in the statutory maximum prices of copper, lead and zinc, the existing list of prices of non-ferrous scrap metals issued by the Directorate of Non-Ferrous Metals (Scrap Disposals Department, Berkeley Court, Glentworth Street, N.W.1) is withdrawn, and shortly will be replaced by an amended list.

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L.N.E.R. Standard Semaphore Signal

Tubular steel replaces former wooden structures

ALTHOUGH the policy of the L.N.E.R. is to instal colour-light signals where possible, such signals are generally introduced in conjunction with completely new schemes such as large power interlockings, or on long stretches of main line where automatic working is required.

Where renewals are necessary in the case of the usual mechanical signalling, and the replacement of wooden signals is almost an everyday occurrence, at one signal box or another, new signals of the type shown in the accompanying illustration are beginning to make their appearance. Although under consideration before the war, the design has been developed during the war period because of the scarcity of timber. In place of the old familiar square wooden post a special steel tube is used to carry the semaphore arms and associated fittings, all of which have been specially designed to fit the circular tube.

The illustration shows typical combined "Stop" and "Distant" running signals; the top arms are the starting signals worked from the local signal box, and the lower "notched" arms the "Distant" signals for the next signal box ahead; orthodox "slotting" to prevent the "off" indication being displayed by the "Distant" until the "Stop" arm above has been pulled off is provided.

Maintenance Work Reduced

The mainline signal on the right is fitted with the usual diamond sign indicating to the engineman that a track circuit is provided at the signal. In each case the arms and also the lights are repeated in the respective signal boxes. The arms are of light pressed-steel construction, treated with vitreous enamel to provide a more permanent colour display between the respective arms. Such arms require only washing periodically to maintain their good appearance and are a great improvement as compared with the old painted wooden arms, which soon become dirty. The new arms are of the upper quadrant type which, when operated to the "off" position, moves to an angle of 45° above the normal horizontal position as shown in the case of the "Stop" signal on the right. This arrangement, while presenting a more

positive "off" indication to the drivers, has the great advantage that if the arm should become coated with thick snow and tend to droop, it will thereby be more likely to resume the "Danger" aspect and prevent a "false clear" indication, such as

occasionally happened with the old type of "lower quadrant" arms.

The tubular posts are specially treated at the base to prevent corrosion at and below ground level and, above ground level, painted white in accordance with the new standard practice. Upwards of 70 separate parts, without taking into account the numerous fixing bolts and screws, are required to make up either of the signals shown in the illustration.



Combined "stop" and "distant" running signals, L.N.E.R.

PUBLIC SERVICE VEHICLES (CONDUCT OF DRIVERS, CONDUCTORS AND PASSENGERS).—The Minister of Transport recently gave notice that, in pursuance of the powers conferred on him by the Road Traffic Acts, 1930 to 1937, he had made the Public Service Vehicles (Conduct of Drivers, Conductors & Passengers) (Amendment) Regulations, 1946. Prints of the regulations may be obtained from H.M. Stationery Office, York House, Kingsway, London, W.C.2; Edinburgh; Manchester; or Cardiff.

DELANCEY CONTOUR-GRINDING MACHINE.—A. C. Wickman Limited, Coventry, announces that it has been appointed sole agent and engineering representative in Great Britain and the rest of the world, with the exception of the U.S.A., Canada and the South American republics, for the Delancey contour-grinding machine designed and manufactured by the Delancey Tool & Engineering Works Limited, Delancey Street, London, N.W.1. This machine, intended principally for the grinding of cams and similar contours, uses plate templates to control the con-

tours being reproduced. It carries a precision ground spindle mounted on a vertical slide; the spindle is driven at a speed of 20,000 r.p.m. by a ½-h.p. totally-enclosed 400-440-volt, 3-phase, 50-cycle electric motor. A bench space of 24 in. by 24 in. is required for the machine, and the work table is machined dead square on all sides.

HADFIELDS LIMITED, LONDON OFFICE.—Hadfields Limited is re-organising its London office, considerably extending the scope of its activities. Mr. A. J. Jack has been appointed Manager under the new arrangement. Mr. Jack was previously in charge of Technical Development, and is a son of the late Mr. A. G. M. Jack, at one time Deputy-Chairman of the company. Mr. W. H. Salmon, Steel Foundry Superintendent, has been appointed Technical Sales Representative for Steel Castings of the company. This appointment has been made as part of the company's future sales development, to place expert technical service at the disposal of engineers, designers and all users of steel castings.

Besides being Lecturer in Foundry Practice and Science at Sheffield University, he is President of the Sheffield Branch, and a member of the education committee, of the Institute of British Foundrymen, and recently has collaborated with Mr. Eric N. Simons in a text-book on foundry practice, which is to be published shortly.

L.P.T.B. FURTHER IMPROVED SERVICES.—Further improvements in bus, tram, and trolleybus services of the London Passenger Transport Board took effect on April 17. These comprise increased services, extended or varied routes, and later vehicles on all road transport systems. They bring the number of scheduled miles weekly of central buses to 4,201,788, or within 4½ per cent. of the pre-war mileage, and an increase of 1,066,589 miles since immediately before VE Day. A smaller programme of further improvements will become operative in May, and both the present programme and that for May include improvements to Green Line coach services. New summer timetables will be introduced on the Underground railways in May.

Restoration of the "Golden Arrow" Service

Demonstration run on April 13 before resuming public service on April 15

AS a prelude to resuming public service on April 15, "The Golden Arrow" Pullman car express boat train of the Southern Railway made a demonstration run from Victoria to Dover and back on April 13, conveying press representatives and other guests of the railway company.

For this special run the train was composed of nine Pullman cars, consisting of the five first class and two second class cars and the new Trianon cocktail-bar car that will be the normal formation, together with a Pullman buffet car which has been entirely fitted and furnished internally with Wareite plastic materials.

The train was hauled by the "Merchant Navy" class Pacific locomotive, No. 21C1, *Channel Packet*, embellished with a large golden arrow on both sides of the air-smoothed boiler casing, a "Golden Arrow" device on the smokebox, and the British and French flags forming a victory "V" on the front buffer beam. The weight of the train was approximately 340 tons, which is much the same as it is in daily service, when, although the buffet car is omitted, luggage vans are included.

The new Trianon cocktail bar car is available to passengers of both classes. It has been designed to give the maximum counter space, and is provided with "stand-up" seats on the window side which enable passengers to relax without obstructing the gangway. The interior decoration, in smoke blue, is carried out in woven asbestos fabric, with window curtains of the same material.

A public address system has been installed throughout the train for broadcasting information regarding passport, luggage and customs procedure. The amplifier, supplied by the Acoustical Manufacturing Co. Ltd., gives an output of 35 watts, and on the demonstration run was operating forty Vitavox loudspeakers. Power supply is taken from a rotary converter operated on the 24-V. d.c. train lighting circuit, and giving an output of 230 V. a.c. The amplifier circuit consists of a rectifier and four audio-frequency valves, with a push-pull output stage. A moving coil hand microphone is used for making announcements.

The demonstration train, running to the timings of the daily service on the down journey, left Victoria at 10 a.m. On arrival at Dover Marine Station at 11.40 a.m., the party inspected the Southern Railway cross-Channel steamer, ss. *Canterbury*, now returned from war service and completely refitted. The new radar system was in operation, and on the screen of the receiver on the navigating bridge, visitors were able to see an outline plan of Dover harbour, picked up by a rotating aerial on a tall tubular mast. Three scales of display are available, showing objects within radii of 30 miles, 15 miles, or 6,000 yd. of the ship. The bearing of any object shown is measured by adjusting a hairline pointer to coincide with it, one end of the pointer travelling round a scale calibrated from 0° to 360°. Range is estimated with the help of concentric circles at 6,000-yd. intervals.

Later, the party assembled in the dining saloon of the *Canterbury* to toast the restored "Golden Arrow" service.

Mr. C. Grasemann, Public Relations & Advertising Officer, Southern Railway, said that the service was the most vigorous sign of getting back to peace they had seen since the war. Sir Eustace Missenden had agreed to this pre-view of the

train and ship so that they could be inspected in more convenient conditions than when they were back in daily service. They had with them Mr. H. A. Short, Deputy

Traffic Manager, Mr. S. W. Smart, Superintendent of Operation, and many of their colleagues, all of whom had worked so hard in restoring the service. They also welcomed Mr. Burrow, representing the Docks & Marine Manager, Mr. Hacker, their Continental Representative, and Mr. Harding, General Manager of the Pullman (Continued on page 438.)



The "Golden Arrow" at Victoria Station on April 13



Interior of new Trianon cocktail bar car



Decorated entrance to Continental platform at Victoria

RAILWAY NEWS SECTION

PERSONAL

The Hon. Rupert E. Beckett (Chairman of the Westminster Bank Limited) has been elected Deputy-Chairman of the Committee of London Clearing Banks. He is a Director of the London & North Eastern Railway Company.

Under authority of a Royal Warrant, the Viceroy of India has conferred the honour of knighthood on Mr. George Eustace Cuffe, General Manager, Bombay, Baroda & Central India Railway, and lately Director-General of Railways (Calcutta Area), Calcutta. His Majesty's approval of this knighthood was signified on January 1, 1946.

Sir John Forster has been appointed King's Counsel. He is Chairman of the Railway Staff National Tribunal, and President of the Industrial Court.

The Minister of Transport has approved the appointments of Mr. J. G. Pidgeon as Divisional Road Engineer, South-Western Division, to succeed the late Colonel H. T. Tudsbury; and of Mr. J. E. Cardell as Divisional Road Engineer, North-Midland Division, to succeed Mr. A. E. N. Taylor, who has been transferred to headquarters as Assistant Chief Engineer in place of Mr. E. S. Perrin, who has retired.

Mr. G. H. Latham has been appointed President-elect of the British Iron & Steel Federation, to take office in 1947 in succession to Mr. Ellis Hunter. Mr. Latham is Chairman & Managing Director of the Whitehead Iron & Steel Co. Ltd., and was formerly Managing Director of Richard Thomas & Baldwins Limited. He is Chairman of the Light Rolled Steel Products Conference.

Mr. Andrew Jollie is retiring from the Chairmanship of the National Association for Rolled & Re-rolled Steel Products. His successor is Mr. G. H. Latham.

John Brown & Co. Ltd. announces that Sir Thomas Bell, on account of advancing age, has resigned his seat on the board. The company also announces that Sir Arthur Matthews has been elected a Director. Sir Arthur Matthews is Managing Director of Thos. Firth & John Brown Limited; a Director of Firth-Vickers Stainless Steels Limited, Markham & Co. Ltd., David Brown & Sons (Huddersfield) Ltd., and Chairman of Firth-Derihon Stampings Limited.

Mr. J. H. Williams, who was seconded to the Ministry of Home Security during the war, resumed duty with the L.P.T.B. on April 1 as Equipment Engineer (Road Services). He will be responsible to the Chief Mechanical Engineer (Road Services) in a co-ordinating and advisory capacity in respect of all building, plant and equipment matters affecting the works, garages and depots of the Road Services Department and for which the Works and Rolling Stock Officers are primarily responsible.

Mr. Oliver Robert Hawke Bury, M.Inst.C.E., whose death was recorded in our March 29 issue, retired last December from the board of the London & North Eastern Railway Company, of which he had been a member since 1923, before which he had been a Director of the Great Northern Railway Company for ten years, and General Manager of the latter railway from 1902 to 1912. Mr. Bury received his early training in the Engineer-

Director of the Peruvian Corporation Limited, resigning last October. Last January he retired from the Chairmanship of the London Electric Supply Corporation Limited and of the London Power Co. Ltd.

Mr. P. C. Pope, who has been Secretary of the Institute of Fuel from its earliest days, has resigned, but will act as Adviser to the Institute. The council of the Institute has recommended him for election as an Honorary Member. Mr. R. W. Reynolds-Davies has been appointed Secretary to the Institute; he had been Deputy-Secretary since October 1 last.

Sir Wallace Akers, who is resigning from his post as Director of Atomic Bomb Research, Department of Scientific & Industrial Research, after a holiday will resume his duties on the board of Imperial Chemical Industries Limited.

Mr. F. G. Woollard is to serve as President of the Institution of Automobile Engineers for 1946-47, his second year of office, with Captain G. T. Smith-Clarke, Mr. W. W. Constantine and Mr. R. Pentony as Vice-Presidents.

We regret to record the death on April 15, at the age of 91, of Mr. Laurence Bernard Page, who was Solicitor to the Great Western Railway Company from 1909 until his retirement in 1919.

We regret to record the death of Mr. H. W. Jones, Chief of Motive Power, Pennsylvania Railroad, since 1941.

Captain R. A. Clarke, previously Assistant General Manager, has been appointed General Manager of Canadian National Steamships, succeeding Mr. R. B. Teakle, who retires after 27 years with the company.

Mr. S. L. Smart, Registrar of the Southern Railway Company, who, as recorded in our March 15 issue, retired at the end of that month, was educated at St. Olaves School. He entered the service of the South Eastern Railway in 1898 (at the time when all juniors served an apprenticeship for five years), and, after passing through all sections of the department, became Chief Clerk in 1917. He became Chief Clerk of the Stock & Transfer Office of the Southern Railway in 1928, Assistant Registrar in 1939, and Registrar in 1944. He served under nine Registrars in his 48 years' service. Mr. Smart comes from a railway family; his late father completed 51 years, and his grandfather over 40 years.

Mr. W. S. M. Stapleton, who, as recorded in our March 15 issue, has been appointed Registrar of the Southern Railway Company, as from April 1, entered the Secretary's Office of the late London Brighton & South Coast Railway Company in 1912. During the war of 1914-18 he served with the London Rifle Brigade



Elliott

L. Fry

The late Mr. Oliver Bury

Director, Great Northern and London & North Eastern Railway Companies, 1912-45; General Manager, Great Northern Railway, 1902-12

ing and Locomotive Departments of the London & South Western Railway, and in the Civil Engineering Branch of the Coleford & Monmouth Railway. He later was appointed Chief Engineer, Great Western of Brazil Railway. After becoming General Manager & Chief Engineer, Entre Rios Railways, he was appointed General Manager, Buenos Ayres & Rosario Railway (now part of the Central Argentine Railway). He returned to England in 1902, and became General Manager of the Great Northern Railway. In 1904 he formed a commission to report on the working of the Egyptian State Railways. Mr. Bury resigned from the General Managership of the G.N.R. in 1912, and became a Director. On the grouping in 1923 he continued as a Director of the L.N.E.R., on the board of which he remained until his retirement last December. Mr. Bury joined the board of the Leopoldina Railway as Chairman in 1913, a position he held until 1937. He had also held the Chairmanship of the San Paulo (Brazilian) Railway Co. Ltd., which he resigned in 1943, and had been Chairman & Managing

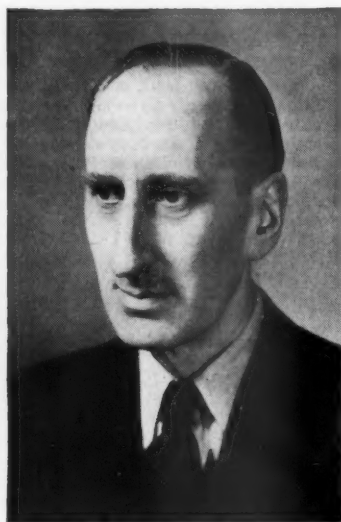


Mr. S. L. Smart

Registrar, Southern Railway Company,
1944-46

and Royal Irish Rifles. Mr. Stapleton joined the Secretary's Office of the Southern Railway Company on the amalgamation; and, after serving in various capacities, he was appointed Private Secretary to the Chairman (the late Mr. Robert Holland-Martin) in 1939. He was Acting Assistant Secretary of the company from April, 1944, to December, 1945.

Mr. John Ratter, C.B.E., B.Sc., A.M.Inst.C.E., Assistant District Engineer, Sheffield, L.N.E.R., who, as recorded in our February 15 issue, has been appointed District Engineer, Guide Bridge, is at present on attachment to the Engineer (London). Mr. C. B. Glenesk, who for some time has been Acting District Engineer, Guide Bridge, is continuing in that capacity. Mr. Ratter was educated at St. Peter's School, York, and at Durham University, where he graduated with honours. In 1929 he became a graduate pupil under the late Mr. John Miller (then Engineer,



Mr. W. S. M. Stapleton

Appointed Registrar, Southern Railway
Company

North Eastern Area, L.N.E.R.), and afterwards held various appointments until 1936, when he joined the L.P.T.B. as Assistant, Permanent Way Engineer's Department. He became Divisional Assistant (Permanent Way) on day-maintained sections in 1937. He rejoined the L.N.E.R. as Assistant District Engineer, Sheffield, in 1938. Mr. Ratter had been Section Officer, 150 Railway Construction Company, R.E. (Supplementary Reserve), from 1932 to 1936. He was mobilised on August 31, 1939, and served as Section Officer, 8th Railway Construction & Operating Company, R.E., in France; as Second in Command, 160 Railway Construction Company, on home service; and as Staff Captain (Tn. 4), War Office. He was D.A.D.Tn., War Office, as Major, 1940-42; Assistant Director of Transportation, First Army, later A.F.H.Q., as Lt.-Colonel, 1942-44, and saw service in North Africa and Italy; and Deputy-Director of Transportation, A.F.H.Q., as Colonel, 1944-45, and served in Italy. While A.D.Tn. in

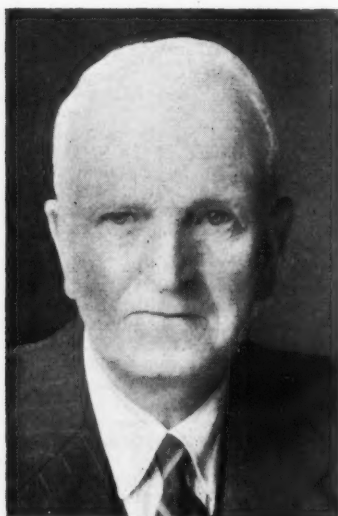


Mr. John Ratter

Appointed District Engineer,
Guide Bridge, L.N.E.R.

Africa and Italy he was responsible to the Director of Transportation for all British railway construction in the A.F.H.Q. zone. As Deputy-Director his responsibility extended to all Allied railway construction in Italy. He was demobilised with the honorary rank of Colonel in September, 1945. Mr. Ratter was mentioned in despatches in 1943, and was awarded the O.B.E. and the Legion of Merit (U.S.A.) in 1944, and the C.B.E. in 1945. He was Honorary Editor of the *Journal* of the Permanent Way Institution, 1937-39, to which post he has been re-elected after his absence on active service.

Mr. W. Anthony, who, as recorded in our March 8 issue, has retired from the position of Works Superintendent of the Viaduct Works, Earlestown, L.M.S.R., began his career on the Midland Railway, Derby, in the Carriage & Wagon Department, as an apprentice. On the expiration of his apprenticeship he left the company and joined the Brush Electrical Engineer-



Mr. W. Anthony

Works Superintendent, Earlestown,
L.M.S.R., 1931-46



Mr. A. E. Bates

Appointed Works Superintendent,
Earlestown, L.M.S.R.



Mr. E. E. Horney

Chief Inspector at Euston Headquarters,
L.M.S.R., who has retired

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ing Co. Ltd., Loughborough, but later joined the Lancashire & Yorkshire Railway, in the Carriage & Wagon Department, Newton Heath. He occupied various managerial positions in the Outdoor Section of that department, and eventually was transferred to the main factory. He became Assistant Works Manager in 1920, and Works Manager in 1927. From 1929 to 1931 he was on special duties at headquarters, Derby, but in 1931 was appointed Works Superintendent, Viaduct Works, Earlestown.

Mr. A. E. Bates, Assistant Works Superintendent, Carriage & Wagon Works, Derby, L.M.S.R., who, as recorded in our March 8 issue, has been appointed Works Superintendent, Earlestown, was born at Derby. He received technical training at Derby Technical College, and works training in Derby Carriage & Wagon Department, L.M.S.R. From 1929-35 he was a draughtsman in the works drawing office, Derby Carriage & Wagon Department, and from 1935-42 Works Foreman, Welding & Underframe Shop, New Carriage Body Building Shop, Derby. In 1942 he was appointed Assistant to Works Superintendent (Production Planning), Derby Carriage & Wagon Works, and from 1943 carried out special duties at headquarters including the introduction of progressive repairs for wagons at outstations. In 1945 he became Assistant Works Superintendent, Derby Carriage & Wagon Works. During the war Mr. Bates was Deputy-Controller of the repair organisation for dealing with "Hampden" bomber aircraft of which organisation the late Mr. C. E. Fairburn was Controller.

Mr. Edward Ernest Horney, B.E.M. Chief Inspector at Euston Headquarters, L.M.S.R., retired on March 21 after 44 years' railway service. Among his treasured possessions are a grandmother clock and a gold wristlet watch, presents from the late Lord Stamp and Lady Stamp in acknowledgment of his many untiring services. Not the least of Chief Inspector Horney's jobs was that of being "on call" throughout every 24 hours. He slept with telephones beside his bed throughout his career, and, during the late war, his duties took him into the thick of the London air raids.

Mr. J. J. Tobin has been appointed Secretary to the British Railways Officers' Guild.

Mr. William Lorimer, Chairman of the North British Locomotive Co. Ltd., has resigned on medical advice, and Sir Frederick C. Stewart has been appointed Chairman.

Mr. J. E. Mott has been appointed Commercial Engineer of the Siemens & General Electric Railway Signal Co. Ltd. (S.G.E. Signals). Mr. Mott has just returned from an extensive tour in South America in connection with the railway and road signalling business of the company.

Mr. S. R. Ager, Chief Clerk to the Road Transport Controller, Chief Goods Manager's Office, Paddington, Great Western Railway, who recently was appointed Assistant to the Road Transport Controller, joined the company in the Goods Department at Birmingham in 1911 and served in various capacities until his transfer to the Birmingham District Goods Manager's Office in 1921. From 1926 to

1934 he was Secretary of the G.W.R. Birmingham District Lecture & Debating Society. In 1936 he went to Shrewsbury as District Cartage Clerk, and with the outbreak of war combined with his duties membership of the District Transport Officer's Advisory Committee, set up under the Ministry of War Transport Emergency Scheme. He left Shrewsbury in 1941 to become District Cartage Clerk in the Bristol area. Two years later Mr. Ager was transferred to headquarters as Clerk-in-Charge of Cartage Operating, and in 1944 he was appointed Chief Clerk to the Road Transport Controller.

Mr. R. H. Wilson has relinquished his appointment as Director of Finance in the Ministry of Transport. He will continue to assist the Ministry by acting as Joint Financial Adviser with Sir Alan Rae Smith.

Mr. A. J. Murphy has been elected to the board of J. Stone & Co. Ltd. Mr. Murphy went to the company as Chief Metallurgist in 1931 from the National Physical Laboratory.

Mr. L. Brooke-Edwards, Manager in India of the Baldwin Locomotive Works (of Philadelphia) since 1930, has arrived in England from India, with a view to opening an office of the company in London.

CANADIAN PACIFIC RAILWAY

Mr. G. A. Hobbs has been appointed General Passenger Agent, *vice* Mr. W. H. Boswell, retired.

Mr. R. J. Harden has been appointed General Agent, Passenger Department, Trafalgar Square, London, *vice* Mr. G. A. Hobbs.

Mr. S. Scott has been appointed Passenger Agent, London City Office, *vice* Mr. R. J. Harden.

MACHINE TOOL ADVISORY COUNCIL

The Minister of Supply has set up a Machine Tool Advisory Council (see also editorial note elsewhere in this issue). Mr. S. F. Steward, who recently relinquished his position as Director-General of Machine Tools, Ministry of Supply, has undertaken to give the Ministry part-time service for a further period, and has been appointed Chairman of the council. The members are:—

Representatives of the machine tool industry: Messrs. W. P. Eastwood, Chairman & Managing Director, George Swift & Sons Ltd.; H. W. L. Kearns, Chairman & Managing Director, H. W. Kearns & Co. Ltd.; G. S. Maginness, Chairman & Managing Director, Churchill Machine Tool Co. Ltd.; R. D. G. Ryder, Joint Managing Director, Thomas Ryder & Son Ltd.; J. H. Goddard, Chairman & Governing Director, Wadkin Limited; J. B. S. Gabriel, Chairman, Charles Churchill Limited.

Independent members: Messrs. W. G. Bass, Director, Ferranti Limited; Isaac Hayward, General Secretary, National Union of Engine-men, Firemen, Mechanics & Electrical Workers.

On the Government side: The Admiralty will be represented by Mr. H. C. Rogers, Deputy-Controller (Production); the Board of Trade by Mr. H. A. R. Binney, Principal Assistant Secretary; and the Ministry of Supply by Mr. E. B. Bowyer, Under-Secretary (Engineering), and by Messrs. J. W. Blackshaw and H. J. Gloag of its Machine Tool Department.

The Joint Secretaries of the Council will be Messrs. J. W. Blackshaw, of the Machine Tool Directorate, Ministry of Supply, and W. J. Morgan, Secretary of the Machine Tool Trades Association.

We regret to record the death on March 23, at the age of 58, of Mr. A. Gilmour, who was Chief Traffic Manager, Western Australian Government Railways, from 1940 until he retired in December, 1944, on account of ill-health.

"GOLDEN ARROW" INAUGURAL DINNER

A dinner to mark the re-opening of the "Golden Arrow" service between London and Paris via Dover and Calais was given by the Southern Railway and Pullman Car Companies at the Charing Cross Hotel, London, on April 14. Among those present were:—

Southern Railway: Colonel Eric Gore Browne (Chairman), Sir Eustace Missenden (General Manager), Messrs. John Elliot (Deputy General Manager), V. A. M. Robertson (Chief Civil Engineer), O. V. Bulleid (Chief Mechanical Engineer), R. M. T. Richards (Traffic Manager), C. Gribble (Deputy Chief Civil Engineer & Engineer for New Works & Bridges), H. A. Short (Deputy Traffic Manager), F. J. Wymer (Assistant Docks & Marine Manager), S. W. Smart (Superintendent of Operation), R. H. Hacker (Continental Superintendent), J. L. Harrington (General Assistant to General Manager), E. W. Belcher (Assistant to General Manager for Hotels & Catering), G. Wynne Davies (Assistant Public Relations & Advertising Officer), J. P. Campbell (Superintendent Marine Engineer).

Pullman Car Co. Ltd.: Messrs. Stanley J. Adams (Chairman), F. D. M. Harding (General Manager).

Compagnie Internationale des Wagons-Lits: Monsieur Deroy (Administrateur), Monsieur Widhof (Directeur-Général Adjoint), Monsieur Mareschal (Directeur de l'Exploitation Générale), Monsieur Ambord (Directeur du Service Commercial).

French National Railways: Monsieur Gourzat (Directeur-Général Honoraire), Monsieur Vagogne (Secrétaire-Général), Monsieur Closset (Secrétaire-Général Adjoint), Monsieur Sauvajol (Chef Adjoint du Service Central du Mouvement), Monsieur Degardin (Chef de l'Exploitation de la Région Nord), Monsieur Prandantier (Chef du Matériel et de la Traction de la Région Nord).

Sir Cyril Hurcomb (Secretary, Ministry of Transport), Sir Reginald Hill (Deputy-Secretary, Ministry of Transport), Monsieur Artaud-Macari (Chef de Cabinet du Ministère des Travaux Publics Français), Monsieur Masset (Directeur-Général de la Société Anonyme de Gérance et d'Armement).

SOUTH AFRICAN RAILWAYS & HARBOURS

Mr. C. T. Long, Locomotive Superintendent, Johannesburg, has been appointed Chief Superintendent (Motive Power), General Manager's Office.

Mr. D. E. Paterson, formerly Harbour Advisory Engineer, Cape Town, who was mainly responsible for the construction of the Sturrock Dock there, has been appointed Assistant Chief Civil Engineer (Harbours) at headquarters, Johannesburg.

Mr. W. H. Evans, Resident Engineer, New Works, Germiston, has been appointed Inspecting Engineer (New Works), Office of the Chief Technical Officer (Reconstruction), Johannesburg.

Mr. A. Goldstein, Resident Engineer (Reconstruction), Cape Town, has been appointed System Engineer, Johannesburg.

Mr. R. MacMillan, Superintendent (Operating), General Manager's Office, has been appointed Superintendent (Operating), System Manager's Office, Johannesburg.

Mr. J. H. Vlok, Superintendent (Commercial & Staff), Cape Town, has been appointed Superintendent (Claims), General Manager's Office.

Mr. C. C. Wedderburn, Superintendent (Operating), Bloemfontein, has been appointed Superintendent (Operating), Cape Town.

Restoration of the "Golden Arrow"

(Concluded from page 434)

Car Company, who had done so much in making the train up-to-date in every way. They also had with them the High Sheriff of Middlesex. Mr. Grasmann then called on the Mayor of Dover to propose the toast of the "Golden Arrow" service.

The Mayor of Dover, Councillor A. T. Goodfellow, said that this was one of the most encouraging mornings he had spent for years. After living in Dover during the war, and knowing the wreckage and destruction it had caused, it was a tonic to come on board this glorious ship and to see the colour and decoration of the "Golden Arrow" train. They were now stepping out on the path that they hoped would lead to a prosperous future, and he looked on this meeting as an earnest of the co-operation that would exist between their town and the Southern Railway.

Mr. H. A. Short, Deputy Traffic Manager, Southern Railway, expressed the thanks of himself, his colleagues, and the Pullman Car Company for their welcome to Dover. On September 3, 1939, the *Canterbury* had left on the last "Golden Arrow" service, and the last passenger service on the short sea route from Dover. The "Golden Arrow" was the most important international link service in the world. The *Canterbury* began her war service in the Channel, then at the Dunkirk beaches, and in 1941 to 1943 she saw service in Northern waters, when she had the honour of bringing the first American troops to Northern Ireland—the first to arrive in the British Isles. She took our troops to the Normandy beaches on D-day, and since the war had been bringing troops on leave.

During the latter years she had been in charge of Captain Walker, who was in command of the *Maid of Orleans* at Dunkirk and won the D.S.C. The names of Captain Walker and the *Maid of Orleans* would go down in the history of the Merchant Marine.

The engine that hauled them to Dover was the *Channel Packet*, so named as a tribute to the sea-going staff of the Southern Railway. They had gone all out to get the service back to normality, and he thought they had achieved some suc-

cess in that respect. The "Golden Arrow" train running between London and Dover was the finest train running on any British railway today. He congratulated all who had got the *Canterbury* back to normal after trooping. The "Golden Arrow" service provided through connections to Switzerland, and would do so to Belgium and beyond in a few weeks' time. He hoped it would aid British prosperity, and those who came to this country to buy our goods.

Captain J. Walker, Master of the ss. *Canterbury*, expressed the thanks of the ship's company for the messages of good will they had received. He was sure that, with such a marvellous send-off, the service would reach its former popularity and efficiency. It was the shortest route to the Continent, and he had no intention of letting it depart from that tradition. He assured all travellers of as warm a welcome as they had had today.

After the speeches, the party lunched on the "Golden Arrow" train, which had been backed to the Admiralty Pier. The train left Dover Marine Station at 3 p.m., and reached Victoria at 4.40 p.m.

On its daily schedule, which began last Monday, the train leaves Victoria at 10 a.m., and Paris is reached, via Calais, at 6.45 p.m. The return service leaves Calais at 11.35 a.m., and the "Golden Arrow" arrives at Victoria at 8.35 p.m.

The following chief officers of the Southern Railway and the Pullman Car Co. Ltd., travelled on the demonstration run on April 13:—

Messrs. E. Burrow, representing Mr. R. P. Biddle, Docks & Marine Manager; F. E. Chrimes, Superintendent of Motive Power; C. Grasmann, Public Relations & Advertising Officer; R. H. Hacker, Continental Superintendent; A. E. Hammett, Commercial Superintendent; F. D. M. Harding, General Manager, Pullman Car Co. Ltd.; Messrs. H. A. Short, Deputy Traffic Manager; S. W. Smart, Superintendent of Operation, Southern Railway.

The single fare to Paris, first class on train and steamer, is £6 10s., or £4 10s. second class rail and first class steamer. Both fares include seat reservation. On the French side there is a through carriage to Basle, and connections at Paris with the "Simplon-Orient" and "Orient" expresses. A through carriage between

Calais and Nice will be restored shortly. The first public service was seen off from Victoria on Monday by Mr. Alfred Barnes, Minister of Transport, who said that the occasion marked not only a new service on the Southern Railway, but was of special significance in the opportunity it gave of renewing our contacts with France, of the importance of whose civilisation the war had given us a deeper realisation.

Questions in Parliament

Railway Directors and Staff Compensation

Mr. W. T. Procter (Eccles—Lab.) on March 18 asked the Minister of War Transport if he would state the amount of compensation paid for loss of office under the Railways Act, 1921, to railway directors; the amounts paid in compensation to officers receiving salary at the rate of more than £350 per annum; the amount of compensation paid to members of the railway staff receiving £350 or less per annum; the number of cases settled by agreement and the number referred to the arbitrator in each class above; and the legal costs of the cases decided by the arbitrator, to the railway companies, and to the railway trade unions.

Mr. Alfred Barnes stated in a written answer: I regret that this information is not available, but I am making inquiries and will circulate the information in the official report later.

Working Hours of Trainmen

Mr. W. McAdam (Salford North—Lab.) on March 18 asked the Minister of War Transport what steps he proposed to take to reduce the excessive hours worked by trainmen on the four main-line companies' systems, having in mind the fact that from the week beginning 12.1 a.m. on Monday, January 7, and ending 12 midnight on Saturday, January 12, 16,347 drivers and 11,837 goods guards worked more than 10 hours, and 156,351 drivers and 83,280 goods guards worked over eight hours and up to 10 hours.

Mr. Alfred Barnes: The number of instances when the hours of duty of drivers and goods guards exceeded eight not ten during the week in question were in fact 92,838 and 32,094 respectively. A great deal of this overtime was incurred while travelling home as passengers, booking on duty, examining notices and preparing engines. With the increasing inflow of men from the Forces I hope that it will be possible to reduce the amount of overtime worked by railwaymen.

Railways' Coal Stocks

Major S. Ramsay (Forfar—C.) on April 3 asked the Minister of Transport whether he would give an assurance that an increased quantity of coal was to be made available to the railways, in view of the grave situation which would arise unless there was some improvement in the present position.

Mr. C. Osborne (Louth—C.) also asked the Minister of Transport what were the stocks of locomotive coal held by the railway companies; how many days' consumption those stocks represented; and whether he was satisfied that the present level of those stocks was adequate to ensure the movement of railway traffic.

Mr. George Strauss (Parliamentary Secretary to the Ministry of Transport) stated in a written answer: The stocks of locomotive coal held by the railway companies at March 23 were 420,000 tons. This represents nine days' consumption. The level of these stocks is causing me concern.



The new "Golden Arrow" Trianon bar car. Note the "Golden Arrow" device, carried on all coaches

Associated Electrical Industries Limited

The forty-sixth annual general meeting of Associated Electrical Industries Limited, was held at the Connaught Rooms, Great Queen Street, London, W.C.2, on April 10, Mr. Oliver Lyttelton, Chairman of the company, presiding.

The Secretary, Mr. R. H. Haviland, read the notice convening the meeting, and Sir Alan Rae Smith, of Deloitte, Plender, Griffiths & Company, read the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said: I refer first of all to the profit and loss account of A.E.I. It shows a charge for depreciation of £221,000 as compared with £236,000 last year. It shows that appropriations to reserves and provisions of £341,000 have been made, and also a transfer to special reserve of £150,000. These appropriations are in pursuance of the conservative financial policy followed by your board, and are justified in view of the large expansion programme which the company will find it necessary to undertake.

The amount paid in preference dividend is increased from £52,000 to £107,000. This is because the A.E.I. preference stock has been increased by £1,361,598 in exchange for £1,500,000 7 per cent. preference shares of B.T.H. This proposal was mentioned by the Chairman last year, when he referred to it as the final step in the policy of financial consolidation of the A.E.I. group. Your directors recommend a dividend of 10 per cent. for the year ended December, 1945, less tax, which will absorb £271,000, leaving a balance to be carried forward of £336,000, as compared with £320,000 brought in from the previous year.

Your directors have given some thought to the dividend policy of the company, and, providing the operating companies of the group continue to earn profits on the same level as at the present, your directors will consider the possibility of interim dividend payments in the future.

I now turn to the balance sheet. The increase in the issued share capital is on account of the issue of preference shares in exchange for the B.T.H. preference shares, to which I have already referred. This year we have included under the head of surplus and reserves an amount of £1,950,000 previously held in the form of suspense reserves in sundry creditors. Since the close of the war your directors have reviewed the general position, and now feel able to regard these reserves as free. This explains why they now appear in the published reserves of the company for the first time.

We are also publishing, as in previous years, a consolidated balance sheet which shows the position of the associated group of companies as a single unit. This year the items in the balance sheet have been re-grouped, and the figures indicate a position of great financial strength. The surplus and reserves amount to a sum of no less than £8,169,000, whilst under current liabilities there are provisions for contingencies which may arise in the course of our business, amounting to £2,487,000. On the asset side of the balance sheet we have adopted recommendations of the Cohen Report and shown the original cost of the fixed assets, namely, £13,206,000. The shareholders will notice that the fixed assets now stand in the books at £3,563,000, being about 27 per cent. of their original cost.

We have also published a consolidated profit and loss account for the group, and this again shows the substantial sums set aside as reserves and provisions in the subsidiary companies. After making these,

the consolidated net profit was £888,000, as compared with £818,000 the previous year.

CHANGES IN DIRECTORATE

Since the last annual general meeting there have been a number of changes in the directorate, and you will be asked to approve the new appointments. Owing to trouble connected with his eyesight, which we earnestly hope will be only temporary, Sir Felix Pole resigned the chairmanship, but he has retained his seat on the board, and has consented to act as Deputy Chairman of this company and Chairman of the British Thomson-Houston Co. Ltd. We can indeed count ourselves as fortunate that the advice of Sir Felix Pole, who has rendered such signal services to us in the past, is still available to us.

I was offered the chairmanship from October 1, and gladly accepted. Mr. H. N. Sporborg retired after 43 years' service. Sir George E. Bailey was appointed Managing Director in June last. Mr. I. R. Cox has been appointed Managing Director of the Metropolitan-Vickers Electrical Co. Ltd. and Mr. H. W. H. Warren, Managing Director of the British Thomson-Houston Co. Ltd.

Since the end of the war considerable re-arrangement of the staff has taken place, so that the organisation should be equipped for the great expansion of the industry which we confidently expect. These re-arrangements are not complete and cannot be complete until those of our senior staff who are still with the Services return to us. We intend to carry on our policy of promoting younger men from within our organisation to responsible positions.

PRODUCTION DURING THE WAR

I propose to devote a large part of my general remarks to a history of your companies' activities during the war, activities which we have hitherto been unable to describe for reasons of secrecy. First of all let me say that the number of our employees in the Army, Navy and Royal Air Force was at the peak approximately 10,000, and of these 780 held commissioned rank. They received numerous awards and commendations. We record with sorrow that 354 men gave their lives, and unhappily over 100 are still missing. We extend our sympathy to their relatives and to their friends. The numbers who have been demobilised and returned to our service, including repatriated prisoners of war, amount to no more than 1,285.

We did not escape very serious material damage to our manufacturing plants, although the human casualties mercifully were light. Damage was inflicted at Trafford Park (December, 1940), Sheffield and elsewhere, which cost £1,500,000 to repair. Some idea of the size of our war production may be gained by the fact that our contributions totalled about £215,000,000 sterling. But the sums of money representing our war production give no true guide to the part that these companies played in equipping the nation for war. The reason is because our research departments and our technical and manufacturing engineers made a contribution which cannot be measured in money or in output, by discovering new processes, developing, designing and manufacturing new machines and devices. Some of these contributions to new discoveries have made scientific as well as military history. We played a decisive part in four important new developments, namely, radar, gun control, jet propulsion, and the development of atomic energy.

The Metropolitan-Vickers Electrical

Co. Ltd. was a pioneer in the development of radar. In June, 1937, the company received verbal instructions to design and manufacture one set of radar transmitting equipment, later increased to sets for twenty stations. This was the beginning of the chain of home stations which were ready and operating at the outbreak of the war for defence against the Luftwaffe and constituted the first operational radar equipment. The British Thomson-Houston Company also played an original and important role in the development of radar.

Some time before the war the Metropolitan-Vickers Co. Ltd. suggested a means to effect the remote power control of guns and increase the accuracy of high angle guns in naval vessels, enabling them to beat down the attack of high-speed aircraft.

The Metadyne, a machine of special characteristics developed by the company for use in peacetime, was thus adapted to naval gunnery problems.

JET PROPULSION

I now turn to the matter of jet propulsion gas turbines for aircraft. We are proud to think that the first jet-propelled aircraft to fly, designed and constructed by the Gloucester Aircraft Company, was powered by a jet engine made by the B.T.H. Company based on Whittle's design. The Metropolitan-Vickers Company also had begun the development of gas turbines before the war, and had undertaken special work for the Air Ministry in 1938. The development was, however, on different lines, and Metropolitan-Vickers designed and manufactured the first "axial flow" jet-propulsion engine, the Whittle engine being, by the way, of the "radial flow" type. The first flight of a British aircraft propelled entirely by "axial flow" jet-propulsion engines of M.-V. design and manufacture was made on November 14, 1943. Both B.T.H. and M.-V. are now pushing forward with the development of gas turbines for ships and locomotives. There is a wide field for the use of gas turbines where coal and water are not readily obtainable.

ATOMIC ENERGY

Lastly, I must say a few words, whilst discussing these four revolutionary developments, upon research into the release of atomic energy. During the war the Metropolitan-Vickers Company designed and constructed prototype machines for the gaseous diffusion process in collaboration with Tube Alloys. Further, a considerable part of our technical staff, both M.-V. and B.T.H., was lent to the various ministries and Service departments, and we can justly claim that they have played a notable part in research into the subject of atomic energy. Some of these scientists are not yet back from the United States, but the shareholders should know that, from the letters we have received, they have given distinguished and outstanding service in these discoveries, which have already made military and may well in the future make industrial history.

I now turn to other war products of a less startling novelty, but of scarcely less national and military importance. The Metropolitan-Vickers Company was asked by the Ministry of Aircraft Production to undertake the manufacture of heavy bombers. A special factory was built at Trafford Park for the purpose. The company was one of the largest manufacturers of Manchester, Lancaster and Lincoln bombers, and it also made a large number of undercarriages both for Lancasters and Halifaxes.

One of the fields in which the largest in-

crease in production and technique was necessary, was in aircraft magnetos and ancillary equipment. The British Thomson-Houston Company, using several dispersal factories, was the most important contractor for magnetos in the country, and some idea of the tremendous increase in production made necessary by the war may be learnt from the fact that in 1942 over 82,000 large aircraft magnetos were completed, which is more than fifty times the normal output.

FUTURE OF ELECTRICAL INDUSTRY

I must now turn to the future. The reconversion problems which face our group of companies are certainly serious, but they are not on the whole as serious as those which face other industries which had to abandon completely the manufacture of their peacetime products and turn over their resources to the making of warlike stores. So large a part does the electricity industry necessarily play in war, that the reconversion to peace uses, though difficult, is not therefore so fundamental as it is in some other industries.

It has been necessary to multiply and to disperse the manufacturing plants which serve the production of the group, and I think it is notable that we are now carrying on large-scale production in a greater number of industrial centres than before the war. The shareholders will have noticed in the letter concerning the issue of additional capital that the company has a record order book, and they may also be interested to learn that in 1945 our export business, which for six years had been severely cut in the interests of war production, increased by nearly 100 per cent, over the 1944 figure. I need hardly say that we intend to make the greatest effort to expand export trade that lies in our power. We are equipped technically and commercially to do so, and our present difficulties in making quick delivery are mainly due to the shortage of labour.

I now turn to one of the subjects which I feel is of the greatest importance to the development of our undertaking, and indeed of the national life, namely, research. We are now about to expand this great research organisation, and to establish a laboratory devoted exclusively to long-term research under the auspices of the parent company, A.I.E.

NEW CAPITAL ISSUE

The reasons why we have thought it necessary and advantageous to the shareholders to make a new capital issue require little explanation. They are: That we have confidence in the future of our industry; that our business has expanded to such an extent that considerable addition to our productive capacity is required, while heavy sums of money are locked up in stocks and work in progress; that we can see in front of us some years of great activity. I can think of no company or group of companies which have ploughed back profits more conservatively and more consistently into the business than ours. The results are shown in the balance sheet, and a picture is given of a financial solidity and of great plants and installations written down consistently alike in times of prosperity and depression to figures which represent a small part of their original cost and a still smaller part of what their cost would be to-day. The new issue will, I think, put the coping stone upon the financial position. It is a position in which the shareholders can have the utmost confidence.

We have not increased the dividend this year, partly because 1945 was a year of transition, a year of cancelled Government

contracts, but also because the Government particularly asked that companies should not increase dividends as a matter of policy. We have loyally carried this out, and I can only express the hope that the Government will remember that shareholders are one of the classes of the community who have received the least consideration in the war. They have made their sacrifices, but we hope that the time when they are called upon to continue to do so will be short.

I wish to emphasise in the clearest terms that the policy of the company is first directed to provide continuity of employment under the best conditions for everyone employed in the group, and the second—which is a corollary of the first—is by conservative finance and a bold policy of research and development, to satisfy our customers by providing them with tech-

nical knowledge, design and workmanship of the first order. Thirdly, we aim to make "a career open to talent," and our policy is to promote our own staff and workers to the highest positions and only in exceptional circumstances to bring in others from outside our own business.

The report and accounts were unanimously adopted.

At the conclusion of the meeting an extraordinary general meeting was held to approve the following resolutions: That the share capital of the company be increased to £8,696,050 by a creation of a further 838,050 ordinary shares of £1 each; and that as soon as any of the said 838,050 ordinary shares have been issued and are fully paid they be forthwith converted into stock.

The two resolutions were adopted unanimously.

Midland Counties Electric Supply Co. Ltd.

The thirty-third ordinary general meeting of the Midland Counties Electric Supply Co. Ltd. was held in London on April 4, Mr. William Shearer, Chairman of the company, presiding.

The Chairman, in moving the adoption of the report and accounts, said it was his sincere conviction, based on a long experience of their industry, that a State monopoly of this great public service would be detrimental to the future welfare of the country, and that its sponsors, actuated as no doubt they were by patriotic motives, failed to realise the dangers that would follow in its train.

He was convinced that the great body of consumers, which was increasing by many thousands every year, would under State control be served less efficiently and more expensively, that, taken by and large, the vast number of employees engaged in the industry would not be advantaged by having the State as their sole employer, and that repercussions adversely affecting the taxpayer would inevitably ensue.

There had been many instances of Governments taking control of industries and, generally speaking, the results had been far from satisfactory. After the last war, several Governments thought they could operate ships at a profit. They failed. Australia lost £12,000,000 on current and capital accounts in the five years 1923-1928, the French lost £36,000,000 between 1918-1923 and had to sell out. The United States Government lost £600,000,000 in the 12 years between 1920-1932 and were forced to liquidate their position.

They would agree that it was only common sense that the consumer and not the taxpayer should pay for the commodity he purchased. They had always contended that it was right and proper for the consumer to pay, and had never asked the taxpayer to subsidise the industry.

The Minister of Fuel & Power said recently that he was not going to be intimidated by those who opposed the Government's nationalisation proposals. They had no intention, even if they had the opportunity, to intimidate him, nor would the leaders of their great industry engage in any unlawful activities to further their opposition, but after all, this was still, they hoped, a free country and they respectfully said to the Government that they were most strongly opposed to a State monopoly of their industry and would take all lawful steps to combat any proposals to achieve that object.

A national board and/or regional boards

directly or indirectly under Whitehall control would appear to be the panacea, which was advertised as the cure for all the so-called ills. The experiences of this and other countries which he had already quoted in regard to public services did not confirm, but on the contrary refuted, the suggestion of any alleged advantages.

Generally speaking, the three complaints against this great public service are as follows:—(1) The lack of uniformity of voltages and systems of supply; (2) the varying tariffs and methods of charges; and (3) the non-availability of supplies in certain rural areas. The Electricity Commissioners had now decided to standardise on a low pressure voltage of 240 volts.

The Power Companies' Association had made representations to the Electricity Commissioners regarding tariff structures, and the Commissioners had now decided to set up a committee to make recommendations as to how far some degree of uniformity could be attained. Special attention was being given to plans for developing their network in the rural area, and during the two months January and February of this year they actually dealt with supplies to 100 additional farms, the total farms in their areas now connected being about 8,000.

Coal prices continued to rise and today stood at a figure equivalent to 135 per cent above the prices ruling in the year 1939.

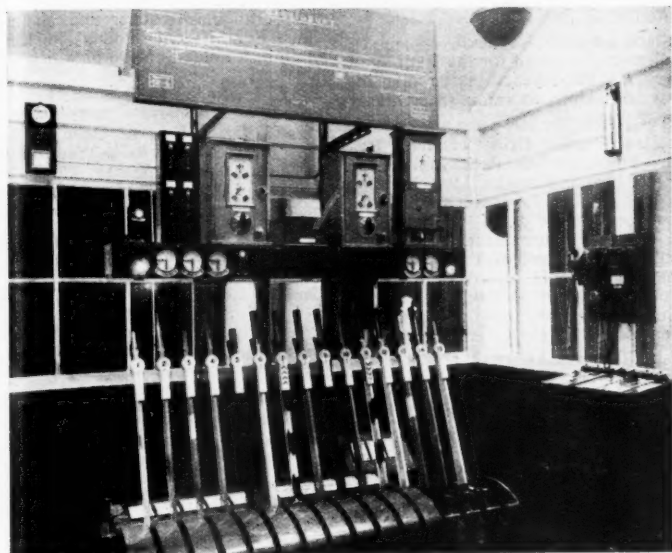
He did not believe that the nationalisation of the coal industry would provide cheaper coal, any more than he believed that the nationalisation of the electricity supply industry would give cheaper electricity to the consumers.

Mr. Shearer then mentioned that an agreement had recently been completed between the Derby & Notts Company and the Central Electricity Board for the construction of a new generating station at Staythorpe, having a capacity of 300,000 kW. The first section, consisting of two 50,000-kW. turbines and six boilers, was scheduled for completion before the end of 1949, and the preliminary work was already in hand.

After dealing with tariff reductions and units sold, Mr. Shearer continued that their interest in road passenger transport consisted of three important undertakings. It should be obvious that only dislocation and inconvenience to the travelling public were likely to result if the existing organisation of transport in the area they served was disorganised by transfer to State ownership.

The report and accounts were unanimously adopted.

L.M.S.R. Signalling Demonstration at Euston



As was briefly recorded in our last week's issue, the Minister of Transport, Mr. Alfred Barnes, on April 10 opened a signalling demonstration in the Shareholders' Room at Euston Station, London, N.W.1. The demonstration will be open daily, except Sundays, between 11 a.m. and 8 p.m., until April 30. Sir Robert Burrows, Chairman of the London Midland & Scottish Railway Company, in introducing the Minister, said that it was hoped that the exhibition will prove of interest to the public, and that it will demonstrate some of the means taken by the railways to ensure the safety of passengers. Many of the developments on view were the result of the scientific research conducted by the company, but some, also, had had their origin in suggestions made by members of the public.

The Minister of Transport congratulated

the company on the interest of the exhibits and expressed the hope that many members of the public using Euston Station would spare time to visit the demonstration and see for themselves some of the means whereby their travelling safety was assured. The safety record of the British railways was extremely high, and he congratulated them on it. He wished that similar standards could be achieved in other forms of transport.

Among those present were:—

Ministry of Transport

Mr. Alfred Barnes, M.P. (Minister of Transport); Sir Cyril Hurcomb (Director-General); Sir Reginald Hill (Deputy Director-General); Sir Alan Mount (Chief Inspecting Officer of Railways); Mr. G. R. Strauss (Parliamentary Secretary); Mr. G. L. Morris (Private Secretary to the Minister); Mr. John Rossick (Director of Public Relations).

L.M.S.R.

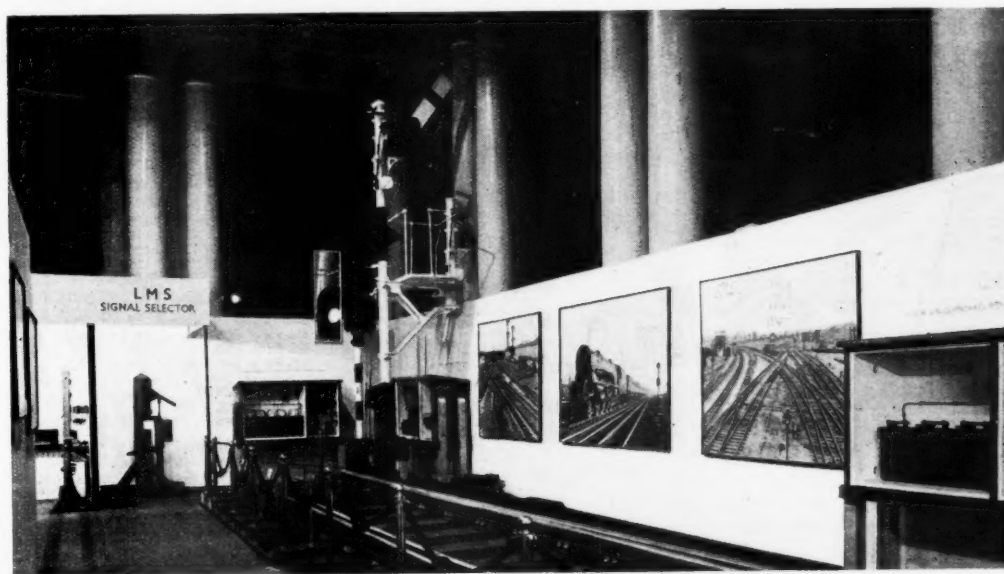
Sir Robert Burrows (Chairman); Sir William Wood (President); Mr. G. L. Darbyshire (Vice-President); Mr. S. H. Fisher (Chief Operating Manager); Mr. W. Wood (Signal & Telegraph Engineer); Mr. F. A. Pope (Chief Commercial Manager); Mr. Jos. O'Neill (Advertising & Publicity Officer).

The demonstration has been laid out under the supervision of the Signal & Telegraph Engineer, Mr. W. Wood, in conjunction with the Chief Civil Engineer, Mr. W. K. Wallace, and the Advertising & Publicity Officer, Mr. Jos. O'Neill.

A standard lever frame has been installed in a light structure representing a signal box. The apparatus, such as that on the instrument shelf above the levers and that under the floor of the signal box, is exactly as used in practice. A short section of permanent way comprising sleepers, chairs, rails, and embodying a pair of points is also demonstrated. These points are operated by an electric point machine from one of the levers in the signal box. The three types of signals provided in conjunction with the track layout are: (1) colour-light multi-unit Distant on tubular steel post; (2) manually-operated upper-quadrant Home on tubular steel post, with bracketed miniature semaphore controlling entrance into the loop; (3) standard electrically-operated upper-quadrant Starting signal. The equipment of the signal box includes a 15-lever frame with mechanical interlocking; standard block instruments and indicators; and track circuit diagram.

Among the many interesting exhibits is a working model of a rotary interlocking block instrument, and also various types of apparatus in general use on the L.M.S.R., such as two Creed teleprinters working direct between each other for demonstration purposes; a traffic control keyboard as provided for traffic controllers to give telephone contact with all signal boxes, yards, etc., in their area.

Amplifiers, microphones and loudspeakers used for station announcements and for controlling traffic in shunting yards are on view, and there is also an electrical signal selector designed by the L.M.S.R. for use where it is desired to operate one or the other of two signals from one lever.



Some of the exhibits at the signalling demonstration at Euston Station, L.M.S.R.

Notes and News

Locomotive Draughtsman Required.—A locomotive draughtsman is required by a West Midland firm with knowledge of latest steam and diesel practice. See Official Notices on page 443.

Manufacturers' Catalogues.—The Chief Mechanical Engineer of the Kenya & Uganda Railways & Harbours would like to receive up-to-date catalogues of railway equipment of all kinds. He would also like to be put on manufacturers' lists to be kept posted of latest developments. See Official Notices on page 443.

Entre Rios Railways Debentures.—The Directors of the Entre Rios Railways Co. Ltd. have decided to pay on April 25 the interest for the six months ended May 31, 1935, on the 5 per cent. debentures of the company, together with the 5 per cent. per annum interest thereon, amounting in total to £3 17s. 3d. per £100 debentures, less income tax.

L.M.S.R. Headquarters' Staff Canteen.—During 1945 the staff canteen at the L.M.S.R. Headquarters at The Grove, Watford, supplied 407,000 main meals, together with a total of 2,125,000 teas or other subsidiary meals and beverages; the price for a main meal averaged 1s. 0.05d. The canteen is run by the staff themselves (in a building supplied by the company) by means of a representative committee, the Chairman of which is Mr. G. Morton, the company's Chief Accountant.

London Transport Statistics Illustrated.—London Transport is exhibiting at all its railway stations a new series of four posters illustrating the immense scope of the board's activities. One poster gives several little-known facts about tickets and the automatic machines that issue them. For instance, the issuing of 2,138,000 season tickets saves 2,400 miles of paper, and in all 1,160 tons of paper and 8½ tons of ink are used each year in the printing of tickets. Emphasising the devices designed for the safety of passengers on the railways, another poster shows that 5,170 electrically operated signals are maintained, and that 844,000 signal movements are made each weekday. The 20,000 pneumatic doors on railway cars open or close 5,000,000 times a day. Other posters deal with the mileage run by rail and road vehicles, and with the extent of the London Transport area, with its 253 stations and

20,300 road services stopping places. Above the letterpress on each poster, there is an appropriate design by the Lebon Studios. The posters have been printed by Waterlow & Sons Ltd.

Assistant Engineer Required.—An assistant engineer is required for the Iraqi State Railways for three years in the first instance with possible extension. See Official Notices on page 443.

Canadian Pacific Orient Offices Reopened.—The Canadian Pacific offices in Hong Kong and Shanghai, which were taken over by the Japanese during the war, are once more open for business. In making this announcement, Mr. George Stephen, Vice-President of Traffic, C.P.R., said that considerable repairs were necessary before they could be used again as traffic offices. The Canadian Pacific has been represented in the Orient since 1886.

British Railways Officers' Guild.—The British Railways Officers' Guild has become established at its registered offices, 129, Finsbury Pavement, London, E.C.2, and (as recorded in our Personal columns this week) the executive committee has appointed Mr. J. J. Tobin as Secretary to the Guild. At a meeting of the executive committee held recently, it was decided that the first general meeting of the Guild members be held in London on May 1, at 6 p.m., at the Livingstone Hall, 42, Broadway, Westminster, London, S.W.1. The Guild states that from inquiries which it is receiving, it is evident that its establishment has created considerable interest, not only in this, but in other, countries. Correspondence and inquiries should be addressed to the Secretary, as above, who will be glad to forward any information desired by members or prospective members.

London Transport Trial of New Bus Route Indicator.—London Transport is trying out a new route-number indicator on Central Buses, which it is hoped will assist intending passengers to pick out the bus they want from among a number standing in a row at a stopping place. There are occasions with the existing type of indicator when the front route-number is obscured by the bus in front. As an experiment, therefore, a new and additional indicator is being placed on the near-side front corner pillars of the lower decks on 80 of the latest type buses operating on routes Nos. 14, 74, 85, 93

and 96 out of Putney Bridge Garage. The indicator, placed just above eye-level, is a small detachable plate on which white numbers are painted one above the other on a black background. The plate, which is 2½ in. wide and 9½ in. long, fits into a neat holder, on top of which appears the word "Route," and is set at an angle of 35 deg. to the front of the bus so that it can be seen from the widest possible angle.

Paris Trade Fair to Open in May.—The Foire de Paris (Paris Trade Fair) will be held this year from May 25 to June 10. Some 120 British firms are taking part, ex-

British and Irish Railway Stocks and Shares

Stocks	Highest 1945	Lowest 1945	Prices	
			Apr. 15 1946	Rise/ Fall
G.W.R.				
Cons. Ord.	60½	47½	56	+ ½
5% Con. Pref.	124½	104½	112½	+ ½
5% Red. Pref. (1950) ..	107½	101½	103	—
5% R. Charge	137½	120	126½	—
5% Con. Guar.	135½	117	122½	+ ½
4% Deb.	118	106	111½	+ ½
4½% Deb.	119½	108	112½	—
4½% Deb.	124½	111½	117	—
5% Deb.	138	124	127	—
2½% Deb.	83	74½	84½	—
L.M.S.R.				
Ord.	33	23½	28	+ ½
4% Pref. (1923)	65	50	58	+ 2
4% Pref.	80½	69½	79½	+ ½
5% Red. Pref. (1955) ..	106½	99½	101½	—
4% Guar.	106½	97	102½	+ ½
4% Deb.	110½	102	107	+ 1
5% Red. Deb. (1952) ..	110½	103½	106½	—
L.N.E.R.				
5% Pref. Ord.	8½	5½	6	—
Def. Ord.	4½	2½	3	—
4% First Pref.	62½	49½	57	+ ½
4% Second Pref.	33½	24½	28½	+ ½
5% Red. Pref. (1955) ..	103	96	97	—
4% First Guar.	104½	95	100	+ 2
4% Second Guar.	97	89½	93	+ 2½
3% Deb.	91½	82½	93	+ 4½
4% Deb.	109½	101	106½	+ 1
5% Red. Deb. (1947) ..	103½	100	100	—
4½% Sinking Fund Red. Deb.	106½	103	103½	—
SOUTHERN				
Pref. Ord.	79½	63	76	+ ½
Def. Ord.	27	20½	22½	—
5% Pref.	124½	104	112	+ ½
5% Red. Pref. (1964) ..	117	107	108½	—
5% Guar. Pref.	135½	117	121½	—
5% Red. Guar. Pref. (1957)	117	106½	108½	—
4% Deb.	117	104½	110	+ 1
5% Deb.	137	124	126½	—
4% Red. Deb. (1962- 67)	112	104½	106½	—
4% Red. Deb. (1970- 80)	113½	104	107½	—
FORTH BRIDGE				
4% Deb.	106	103	103	—
4% Guar.	106	101	102	—
L.P.T.B.				
4½ "A"	125	117	123½	—
5% "A"	135	127	133½	—
3% Guar. (1967-72) ..	100	97½	103	+ 1
5% "B"	125½	115	118½	—
5% "C"	70	58	60	+ 3
MERSEY				
Ord.	37	31½	31	—
3% Perp. Pref.	72½	68½	72	+ 1
4% Perp. Deb.	104½	104	103	—
3% Perp. Deb.	84	78½	81	—
IRELAND* BELFAST & C.D.				
Ord.	8½	6	7½	—
G. NORTHERN				
Ord.	34	24½	38½	— ½
Pref.	52½	42½	59½	— ½
Guar.	80	68	84	— ½
Deb.	97½	87½	100½	— ½
IRISH TRANSPORT				
Common	—	—	17½	— ½
3% Deb.	—	—	101½	— ½

* Latest available quotation



SIGNALS

1,770 electrically operated signals always maintained for passenger safety

There are 844,000 signal movements every weekday

DOORS

35,000 pneumatic doors open or close 5,000,000 times a day on railway carriages. Passengers cannot operate these doors, which are under the control of the train guard; he cannot give the bell signal to start whilst the doors are open



TICKETS

Tickets issued in one year would extend for 31,000 miles if placed end on end. 1,318,000 season tickets save a mileage of 1,400. 1,048 tons of paper are used every year for tickets on which are deposited, in printing, 81 tons of ink

MACHINES

1,780 automatic ticket machines (including 100 coin machines of which 120 give change as well) issue 290,000,000 tickets every year. The tickets from these machines are printed after the money is placed in the machine

Two posters from the new London Transport series giving statistical details of the scope of the board's activities

OFFICIAL NOTICES

Manufacturers' Catalogues

LOCO. DRAUGHTSMEN required with knowledge of latest steam and diesel practice by West Midlands firm. Reply, stating age, experience, qualifications and salary required, to Box No. 7, *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

ASSISTANT ENGINEER required for the Iraqi State Railways for 3 years in the first instance with possible extension. Salary between I.D.70 and 90 a month, according to qualifications and experience, plus high cost-of-living allowance between I.D.18 and 24 a month. (I.D. 1 = £1.) Free passages. Post is not pensionable but there is a Provident Fund. Candidates must be A.M.I.C.E. or hold a degree in engineering and have had experience of railway civil engineering, preferably including experience in the design and construction of railway yard layouts.

Write, quoting E.2150A, to Ministry of Labour and National Service, Appointments Department, Technical and Scientific Register, Room 572, York House, Kingsway, London, W.C.2, for application form, which must be returned completed by May 20, 1946.

THE Chief Mechanical Engineer of the Kenya & Uganda Railways & Harbours desires to receive up-to-date catalogues of Railway Equipment of all kinds. Manufacturers concerned are invited to forward to him literature, together with prices if possible, regarding their products. All catalogues, etc., should be addressed to: The Chief Mechanical Engineer, Post Office Box 21, Nairobi, Kenya.

Manufacturers are invited to place the Chief Mechanical Engineer on their lists to be kept posted of latest developments.

DRAUGHTSMEN wanted. Senior and Junior Draughtsmen with experience in Diesel locomotive design or in steam or railcar practice required. Progressive positions for keen men. Please send particulars of age, salary and when free, to Box 5, *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

BRITISH WORK ON PERSIAN RAILWAYS.

The achievements and difficulties of the R.E.s during the 15 months in which they laid the foundation for effective aid to Russia. Reprinted from *The Railway Gazette*, February 2 and 16, 1945. Price 1s. Post free 1s. 2d.

ROAD, RAIL, AIR TRANSPORT. Mechanical Engineer, A.R.A.E.S., 34, Repair and Maintenance Specialist, requires responsible position overseas with Railway or Transport Operating Company. Eighteen years' experience on locomotives, I.C. engines and aircraft. Good technical education, full apprenticeship (Southern Railway), workshops, running sheds, and 3 years as a factory executive. Resourceful, capable organiser and disciplinarian. Would consider post as Loco. Running Superintendent, Foreman, Inspector, or Locomotive, Motor Vehicle, or Aircraft Repair Supervisor. Moderate salary required to commence.—Box 6, *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

hibiting either directly or through French agents. Of their exhibits, 70 per cent. are machinery, the rest including textiles, radio, and food. The Foire de Paris grounds are situated at the Porte de Versailles, on the south-west of Paris, and cover nearly 100 acres. More than 7,000 firms will be exhibiting, and there will be an inventors' section, with a prize of fr. 50,000, for what is judged to be the most useful invention.

"News Chronicle" Centenary Railway Exhibition.—Lord Portal, Chairman of the Railway Companies' Association, on April 16 at Charing Cross Underground Railway Station, opened an exhibition of railway models. The exhibition is being held in connection with the *News Chronicle* centenary, and as a tribute to the essential service which the railways have rendered in times of war and peace. The exhibits range from a model of Stephenson's *Rocket*, with three period coaches, to reproductions in miniature of the most powerful modern locomotives on the four main-line railways today. Several of the models are worked electrically over a railway track layout, beneath which is shown a section of the London Passenger Transport Board Underground Railways.

Radar for Southern Cross Channel Ships.—The Southern Railway has equipped three cross-Channel ships with radar. They are the *Canterbury*, the *Invicta* and the *Isle of Sark*, all to be back from wartime service this year. The *Canterbury* returned to service on April 15 on the Dover-Calais link of the restored "Golden Arrow" service between Dover and Calais. The *Invicta*, completed in the early part of the war and taken over by the Admiralty, returns in the autumn, and the *Isle of Sark* about mid-summer. With this installation, objects in the path of the ship appear in outline or as spots of light, according to range, on a plan position indicator situated on the navigating bridge. A steamer seven miles away will be reflected on the P.P.I. as a moving spot of light. A buoy two miles ahead will be indicated, and the coastline will appear as a continuous line, exactly as shown on the map, and will be picked up at a distance of 20 miles.

Improved Internal Air Services.—Railway Air Services and West Coast Air Services introduced their summer timetables on April 15. The daily non-stop service between London and Belfast is increased from one to three services, leaving London at 9.30 a.m., 1.0 p.m., and 4.0 p.m., with corresponding return services from Belfast departing at the same times. In addition to the existing morning service (9.45 a.m.) from London to Liverpool and Belfast, an afternoon service operates

daily, departing at 3.0 p.m., with a corresponding return service. The Liverpool—Belfast and Glasgow—Belfast services are increased from two to three services daily. On the London—Glasgow route, Avro aircraft of the type used on the services to Belfast and Dublin are giving a daily service each way, leaving Glasgow (Renfrew Airport) at 9.15 a.m. and London at 4.45 p.m. The flying time will be reduced to 2½ hr., a saving of 55 minutes. Between London and Dublin, two services by West Coast Air Services and two by Aer Lingus Teoranta (the Irish company also operating this route) depart daily from London at 9.15 a.m., 11.30 a.m., 2.45 p.m., and 5.0 p.m.; and from Dublin at 9.0 a.m., 12.0 noon, 2.30 p.m., and 5.30 p.m. All services are weekdays only.

G.W.R. Extension of Time Application.

—The Great Western Railway Company is applying to the Minister of Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending by two years the time limited by section 43 of the Great Western Railway Act, 1937, for the compulsory acquisition of lands required for the construction of Railway No. 1 (Denham & Ruislip) and Railway No. 2 (Dawlish & Exminster) authorised by section 5 of the Great Western Railway Act, 1937, as extended by the Great Western Railway (Extension of Time) Order, 1940, and the Great Western Railway (Extension of Time) Order, 1943, and expiring on October 1, 1946. A copy of the draft application may be inspected at, or purchased at the price of sixpence, at the office of the Solicitor, Great Western Railway Company, Paddington Station, W.2, to whom any representations against the grant of the application must be sent, to arrive not later than May 3, 1946.

L.N.E.R. Burntisland—Granton Ferry:

Abandonment of Working Application.—Notice has been given that application by petition under and in pursuance of the provisions of the Private Legislation Procedure (Scotland) Act, 1936, has been made to the Secretary of State in the month of March, 1946, by the London & North Eastern Railway Company for an Order for purposes of which the following is a concise summary: Abandonment of the working of the ferry across the Firth of Forth between Burntisland in the County of Fife and Granton in the City of Edinburgh and relief from obligations to maintain the works connected therewith. Printed copies of the draft Order may be inspected and copies obtained at a price not exceeding one shilling each at the offices of the Chief Legal Adviser, L.N.E.R., 4, Cowley Street, Westminster, S.W.1, or the Solicitor (Scotland), L.N.E.R., 23, Waterloo Place, Edinburgh,

or Sherwood & Company, St. Stephen's House, Victoria Embankment, Westminster, S.W.1, Parliamentary Agents. The procedure subsequent to the deposit of the petition and draft Order will be by way of Provisional Order unless it be otherwise decided in terms of the Private Legislation Procedure (Scotland) Act, 1936, in which case the procedure may be by way of Private Bill, and in that case the notice given will, subject to the Standing Orders of Parliament, apply to such Bill.

Contracts and Tenders

Mr. H. B. White has joined the Laycock Engineering Co. Ltd. as London Area Sales Manager (Railway Division).

The English Steel Corporation Limited has opened a sales centre in Leicester at 43, Gallowtregate. The office will be in the charge of Mr. Brian T. Good, and he will have with him Mr. H. J. Bird, whose special interests will be tool steel, small tools, and other products of the company's Openshaw works.

Babcock & Wilcox Limited, which some years ago acquired the business of Dewrance & Co. Ltd., has now transferred the whole of the Babcock valve business and the manufacturing capacity of its Dumbarton valve works to that company. Dewrance & Co. Ltd. will continue to operate as a separate organisation and will maintain the manufacture, supply and service of certain designs of Babcock valves.

Below is a list of orders placed recently by the Egyptian State Railways:—

William Jacks & Co. Ltd.: Non-ferrous metals.

Hayward Co. (Addressing Machines) Ltd.; Drawing articles.

Equipment & Engineering Co. Ltd.; Drawing articles.

Richard Melhuish (London) Limited; Drawing articles.

Moore & Wright (Sheffield) Limited; Drawing articles.

Hall Harding Limited; Drawing articles.

Suffolk Iron Foundry (1920) Limited; Welding materials.

Standard Telephones & Cables Limited; Telegraph and telephone material.

British Insulated Callender's Cables Limited; Flex cord and cable.

W. T. Henley's Telegraph Works Co. Ltd.; Copper wire.

Forthcoming Meetings

May 1 (Wed.).—The Institution of Locomotive Engineers, in the Hall of the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1. 6 p.m. "Coal: and its Post-War Carriage on British Railways," by Mr. H. Kelway Bamber, M.V.O., Past-President.

Railway Stock Market

With the prevailing disposition not to take more than a short view, stock markets have developed strength under the combined influences of the decision to abolish E.P.T. at the end of the year, and the more hopeful international situation. Persistent strength of British Funds, stimulated by the Government's latest cheaper money moves, also had an important influence by tending to lower the general yield structure of markets. Business has been on an increased scale, with industrials in short supply, buyers not giving attention to the threat of a future scheme for limiting dividends. Profit-taking developed but was generally well absorbed, although earlier gains were not fully held, and buying became more selective, centring not only on shares of companies with a very adverse E.P.T. standard, but also on shares of companies whose dividends in recent years have been well below the rate earned.

Home rails participated only to a moderate extent in the buoyant market trend, but where changed, were higher, the continued rise in British Funds tending to draw further attention to front-rank debentures and preference stocks. Home rail junior stocks were also in better demand and small gains ruled. The rise in industrial shares and other equity securities, if continued, doubtless would draw increased attention to the big yields obtainable on home rails. The view persists in many quarters that the latter are considerably undervalued at current levels, assuming a fair basis of nationalisation compensation; but investors are not disposed to buy securities of companies which are under the

threat of nationalisation. Because of this iron and steel shares have remained relatively dull despite the buoyant conditions which developed in markets. It is true that financial results showing falling earnings because of difficulties of the transition period, have affected sentiment in some cases, such as Thos. Firth & John Brown, whose shares reacted sharply on the past year's figures. On the other hand, results of other companies in the heavy industries show that earnings have been quite well maintained; and if this is continued it is realised that, in many instances, substantial benefits should arise from the abolition of E.P.T. granted, of course, that the latter were not followed by a new profit limitation scheme.

The assumption is that if active and buoyant markets continue for a period, home railway junior stocks are likely to attract more attention and that there might be good scope for improvement in values. Present improved demand for senior and other preference stocks arises partly from the view that current levels are moderate when judged by their investment merits and also in relation to terms likely to be offered in the event of nationalisation. Guaranteed stocks, reference to which was made last week, have improved with the general trend, but L.N.E.R. second guaranteed still seem to be relatively undervalued.

Compared with a week ago, Great Western has risen further from 55½ to 56, attention being drawn to the favourable pre-war dividend record of this stock. Great Western 5 per cent. preference strengthened to 111½, and the 4 per cent.

debentures to 112. L.M.S.R. ordinary was also better, improving to 28, compared with 27½ a week ago, and demand persisted for the preference stocks, the seniors showing further improvement from 78 to 79½, and the 1923 stock was 57½, compared with 56 a week ago. L.M.S.R. guaranteed was 102½, and the 4 per cent. debentures moved higher at 107.

Reflecting the better trend, L.N.E.R. first preference was 1½ points better at 56½, the second preference also improving from 28 to 28½; the first and second guaranteed stocks were 99 and 92½ respectively. L.N.E.R. debenture stocks were also better. Southern preferred was 76, compared with 75 a week ago; the deferred at 22½ was unchanged on balance, but the 5 per cent. preference gained 1½ at 112. A feature which attracted considerable attention was a steady demand for London Transport "C," which raised the price further from 56½ to 60½. The yield on the latter is not unattractive on the basis of the present dividend. Moreover, the assumption is that nationalisation compensation would have to be on the basis of the standard dividend of 5½ per cent., and stockholders would have their right to the latter dividend if London Transport were left outside a bigger transport nationalisation scheme.

Argentine rails, including debenture stocks, became easier, the tendency now being to await further indications as to the attitude of the Argentine Government. On the other hand, Canadian Pacific were in better demand and rallied to 25½. French railway sterling bonds also moved higher.

Traffic Table and Stock Prices of Overseas and Foreign Railways

Railways	Miles open	Week ended	Traffic for week		No. of Week	Aggregate traffic to date			Shares or Stock	Prices		
			Total this year	Inc. or dec. compared with 1944/5		Totals		Increase or decrease		Highest 1945	Lowest 1945	Apr. 15 1946
						1945/6	1944/5					
South & Central America												
Antofagasta ...	834	7.4.46	£ 26,040	—	14	£ 462,720	£ 431,720	+	£ 31,000	Ord. Stk.	12	8½
Arg. N.E. ...	753	6.4.46	ps. 261,000	—	40	ps. 11,784,300	ps. 11,877,300	—	ps. 93,000	Ord. Stk.	10	52½
Bolivar ...	174	Mar., 1946	4,909	—	13	14,115	16,068	—	1,953	6 p.c. Deb.	8½	5½
Brazil ...	—	—	—	—	—	—	—	—	—	Bonds	25	17
B.A. Pacific ...	2,771	6.4.46	ps. 2,457,000	—	40	ps. 91,061,000	ps. 86,994,000	+	ps. 4,067,000	Ord. Stk.	7	5
B.A.G.S. ...	5,080	6.4.46	ps. 4,502,000	—	40	ps. 143,032,000	ps. 134,653,000	+	ps. 8,379,000	Ord. Stk.	13½	10½
B.A. Western ...	1,924	6.4.46	ps. 1,231,000	—	40	ps. 48,083,000	ps. 45,396,000	+	ps. 2,687,000	"	12½	9½
Cent. Argentine Do. ...	3,700	6.4.46	ps. 3,394,638	—	40	ps. 126,420,315	ps. 116,125,900	+	ps. 10,294,415	"	9½	7
Costa Rica ...	970	30.3.46	43,144	+	39	1,516,178	1,340,167	+	176,011	Dfd.	5	2½
Costa Rica ...	262	Feb., 1946	26,912	+	34	222,104	172,502	+	49,602	Ord. Stk.	7½	4
Dorada ...	70	Mar., 1946	26,161	+	13	85,975	82,705	+	3,270	1 Mt. Deb.	103	102
Entre Rios ...	808	6.4.46	ps. 418,900	—	40	ps. 17,014,800	ps. 15,809,700	+	ps. 1,205,100	Ord. Stk.	7½	4½
G.W. of Brazil ...	1,030	6.4.46	29,000	+	14	440,800	380,800	+	60,000	Ord. Stk.	30/-	23/6
Inter. Ctl. Amer. ...	794	Feb., 1946	\$899,699	+	8	\$1,924,216	\$1,482,373	+	\$441,843	"	—	—
La Guaira ...	22½	Mar., 1946	4,421	—	12	16,850	15,910	+	940	5 p.c. Deb.	78	70
Leopoldina ...	1,918	6.4.46	55,685	—	14	790,193	630,231	+	159,962	Ord. Stk.	4½	3½
Mexican ...	483	7.4.46	ps. 821,500	—	40	ps. 11,443,900	ps. 8,600,900	+	ps. 2,843,000	Ord. Stk.	½	½
Midland Uruguay ...	319	Feb., 1946	12,941	—	33	147,430	138,980	+	8,450	"	—	—
Nitrate ...	382	31.3.46	9,503	+	12	57,202	36,225	+	20,977	Ord. Sh.	75 6	67/6
N.W. of Uruguay ...	113	Feb., 1946	3,791	—	32	44,609	45,207	—	598	"	—	—
Paraguay Cent. ...	274	5.4.46	£54,394	—	40	£2,410,293	£2,386,043	+	£24,250	Pr. Li. Stk.	79½	77
Peru Corp. ...	1,059	Mar., 1946	118,386	—	38	1,252,842	1,170,479	+	82,363	Pref.	10½	7½
Salvador ...	100	Feb., 1946	£233,000	—	32	c 1,080,000	c 957,000	+	c 123,000	"	—	—
San Paulo ...	153½	—	—	—	—	—	—	—	—	Ord. Stk.	60½	50½
Taltal ...	156	Mar., 1946	3,530	+	40	28,020	23,370	+	4,650	Ord. Sh.	17/-	10 6
United of Havana ...	1,301	6.4.46	106,894	—	40	2,211,173	2,162,647	+	48,526	Ord. Stk.	3	1
Uruguay Northern ...	73	Feb., 1946	1,477	—	43	14,090	12,437	+	1,633	"	—	—
Canada												
Canadian National ...	23,569	Feb., 1946	5,771,000	—	8	11,951,200	12,759,400	—	808,200	—	—	—
Canadian Pacific ...	17,037	7.4.46	1,038,400	—	14	15,270,400	15,872,600	—	602,200	Ord. Stk.	24	14½
Various												
Barsi Light† ...	202	Feb., 1946	30,465	+	45	278,032	243,082	+	34,950	Ord. Stk.	131	123
Beira ...	204	Jan., 1946	69,229	—	16	274,482	314,277	—	39,795	"	—	—
Egyptian Delta ...	607	22.2.46	18,343	—	39	514,206	570,441	—	55,835	Prf. Sh.	10	8½
Manila ...	—	—	—	—	—	—	—	—	—	B. Deb.	71	5½
Mid. of W. Australia ...	277	Feb., 1946	15,858	+	32	134,118	155,340	—	21,222	Inc. Deb.	97½	85
Nigeria ...	1,900	Jan., 1946	364,084	—	42	2,794,107	3,133,455	—	339,348	"	—	—
Rhodesia ...	2,445	Jan., 1946	491,378	—	16	2,009,946	2,068,980	—	59,034	"	—	—
South African ...	13,301	9.3.46	1,113,674	—	49	49,959,919	45,721,491	+	4,238,428	"	—	—
Victoria ...	4,774	Nov., 1945	1,252,024	—	—	—	—	—	—	"	—	—

†Receipts are calculated @ 1s. 6d. to the rupee